Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 90	)	
of the Commission's Rules	)	WT Docket No. 07-100

COMMENTS OF PROS LTD

Pros Ltd is an RF engineering and licensing assistance firm which has been involved with the design, construction and licensing of Part 90 radio system for over 30 years.

Our customer base represents equipment manufacturers, radio dealers, end users and consulting firms within the industry. Both Public Safety and Business licensees and applicants are represented.

For the last three years, we have been directly involved with the narrowband transition planning of the Class 1 Railroads, and been a participant on the American Association of Railroads Wireless Communications Committee.

These comments specifically address the proposed modifications to 90.187 *Trunking in the bands between 150 and 512 MHz*. in the **SECOND REPORT AND ORDER AND SECOND FURTHER NOTICE OF PROPOSED RULE MAKING (FCC 10-36),** but have wider

applicability to WT Docket 99-87 and the coordination criteria for narrow (12.5 kHz) and very narrow (6.25 kHz) frequencies for non-trunking applications.

SUMMARY

The proposed new 90.187(d)(1)(A) *Spectral Overla*p and the 90.187(d)(1)(B) contour criteria together determine the ability to license new stations for FB8 exclusive-use operations. However, the same standards are also generally used for applications for conventional stations in the Public Safety Pool, and often times in the Business/Industrial Pool, especially for Critical Infrastructure Pools (IP, IW, LR and LA labeled frequencies).

The specific spectral overlap criteria are – in and of themselves – perfectly acceptable. However, the more inclusive definition of an "affected licensee" caused by the proposed rule change, along with generally conservative LMCC derating contours for adjacent channel licensees will have a major (and unnecessary) detrimental affect on the ability of applicants to build spectrally efficient trunked systems, and impede the Commission's goal of spectral efficiency through increasing the deployment of narrow or spectrally efficient technologies.

We will address each area which impacts this statement, and provide a possible solution and several recommendations that may assist the Commission, the FAC's and the industry to a quicker, more rational and more spectrally efficient PLMR environment.

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A. Current Spectral Overlap Rule

The current spectral overlap rules for defining adjacent channel "affected licensees" is defined in Part 90.187(b)(2)(iii), paragraphs (A) for 25 kHz channels, (B) for 12.5 kHz channels, and (C) for 6.25 kHz channels:

> (A) For trunked stations proposing 25 kHz channel bandwidth: Existing co-channel stations and existing stations that have an operating frequency 15 kHz or less from the proposed trunked station.
>
> (B) For trunked stations proposing 12.5 kHz channel bandwidth: Existing co-channel stations and existing stations that have an operating frequency 7.5 kHz or less from the proposed trunked station.
>
> (C) For trunked stations proposing 6.25 kHz channel bandwidth: Existing co-channel stations and existing stations that have an operating frequency 3.75 kHz or less from the proposed trunked station.

This can be transformed into the following table:

Proposed Station	**Incumbent Authorized Bandwidth**		
	25 kHz	*11.25 kHz*	*6 kHz*
25 kHz	15.0 kHz	15.0 kHz	15.0 kHz
12.5 kHz	7.5 kHz	7.5 kHz	7.5 kHz
6.25 kHz	3.75 kHz	3.75 kHz	3.75 kHz

Chart 1: Current Spectral Overlap Parameters

Under the current rules, if an applicant is applying for a narrow band (12.5 kHz) frequency, then they do not need to consider adjacent wide band licensees. The rule part appears to be specifically written to favor the more efficient narrow and trunked systems.

As well, with the recent introduction of two 6.25 kHz or equivalent technologies (hereafter called “very narrow”), an applicant does not have to consider adjacent 12.5 kHz (hereafter called “narrow”) licensees.

For a time, this led to many spectrally efficient trunked systems being licensed in locations in which frequencies were not previously available.

However, because the wider, less efficient systems were explicitly excluded from consideration when licensing the more efficient systems, the potential for some degradation or interference to them was inherent in the rule.

This appears to have been the intent, to speed the transition to narrower technologies.

However, many of the FACs anticipated interference in these situations, and have refused to recommend such applications, or objected to the recommendation, and/or expressed reservations on the recommendation of the original filing FAC. This is especially prevalent in the Public Safety bands.

B. The Commission's Anticipation of Degradation to Wide Band Systems

When the Commission first ordered the conversion of the PLMR industry to ever more efficient and narrower systems in 1995, the question of adjacent channel protection criteria was addressed[1] :

> … Specific restrictions will depend on a number of system parameters such as transmitter power, antenna height, and distance between stations, all of which may vary considerably between systems. We believe that there is not a sufficient record in the comments on which to base specific adjacent channel station separation requirements with respect to the new channelization plan. We also believe that the frequency coordinators, with their knowledge of user requirements and local conditions, are in a better position than the Commission to determine separation distances needed in each case. Accordingly, we are not adopting any specific mileage separation requirements at this time. The current separation requirements in 47 C.F.R. § 90.173 will remain in effect until June 1, 1996. After this date we will require the appropriate frequency coordinators to review applications for adjacent channel usage and determine appropriate separation distances based upon the technical characteristics of proposed and existing station(s). We will revisit this issue if the land mobile community believes specific adjacent channel station distance separations are needed.

In effect, there was insufficient data available, and the Commission gave the FAC's the job to determine appropriate recommendations.

However, it appears that the Commission did not intend that the wider, less efficient stations have the same degree of protection as the more spectrally efficient systems and technologies.

[1] Section 3, paras 74,75,76 "Adjacent Channel Separations" .FCC 92-235 , PR Docket No. 92-235 *REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULE MAKING* Adopted: June 15, 1995

In 2000, this was specifically stated to one of the FACs concerned about this issue in the FIFTH MEMORANDUM OPINION AND ORDER of the original refarming docket[2] :

> Finally, we wish to address UTC's concerns regarding the interference susceptibility of wideband receivers. We urge frequency coordinators to avoid coordinations that would place interfering Signals within the passband of such receivers whenever possible. However, the PLMR community should recognize that the gradual transition from 25 kHz to 12.5 kHz and, eventually. to 6.25 kHz operation may render some wideband systems increasingly obsolescent and susceptible to interference. necessitating eventual replacement of 25 kHz equipment with more modem and selective narrowband equipment.

Finally, in the 2007 THIRD REPORT AND ORDER in Docket 99-87, the Commission's frustration with the slow pace of narrowbanding was given as background to its decisions in that order, and the issue was again addressed[3]:

> It believed that the mandate was unneeded because, as systems reached the end of their service life and new radios were needed, users would migrate to the narrower bandwidth multi-mode radios in order to avoid the adjacent channel interference that could occur from systems using the adjacent narrowband channels.

From these series of comments, and from the original design of the spectral overlap "affected licensee" section of 90.187, it appears that the Commission was willing to allow, and even anticipated that as more efficient systems were built, that the less efficient would be subject to more, and higher degrees of degradation, and this would contribute to an accelerating process of the entire industry moving to more efficient radio equipment and systems.

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[2] Para 17, FCC 00-439, PR Docket 92-235, *FIFTH MEMORANDUM OPINION AND ORDER*, Adopted December 14. 2000

[3] Para 3, FCC 07-39, WT Docket No. 99-87, *THIRD REPORT AND ORDER*, Adopted March 22, 2007

C. FACs Adjacent Channel Clearance Criteria

As PROS Ltd has been involved in the licensing process, and interacted with FAC's for over 20 years, we are aware that the criteria that they use for coordination occasionally changes. In order to test our logic and to prepare our comments, we sought current coordination criteria from the Land Mobile Communications Council (LMCC) directly.

Via email and a letter through the US Postal Service, we requested the LMCC's current coordination clearance criteria for each possible case of coordination of channels in both UHF and VHF[4].

We later made the same request to the majority of the FAC's directly. We were not particularly successful in obtaining useful information other than another copy of the "6.25 kHz or Equivalent" coordination clearance criteria. Since we received no explanation of how this consensus standard would be applied in all pertinent coordination cases as requested, or any information about the other cases on which we requested information, PROS constructed the chart below based on our experience with the FACs generally accepted criteria.

We would be hopeful that if the FACs find this incorrect, or inaccurate, that they would contribute to this docket with the correct information. Absent that, based on the most common adjacent channel coordination cases that could involve interference, we constructed the following chart:

[4] A more detailed explanation, and copies of the letters sent to the LMCC and the FACs are enclosed in Appendix A

Common Cases Where Interference May Be Present

UHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC
1	4 kHz D	6.25 kHz	11 kHz A	8
2	11 kHz A	6.25 kHz	4 kHz D	8
3	4 kHz D	6.25 kHz	7.6 kHz D	8
4	4 kHz D	6.25 kHz	16 kHz A	8
5	16 kHz A	6.25 kHz	4 kHz D	8
6	11 kHz A	12.5 kHz	16 kHz A	12.5
7	16 kHz A	12.5 kHz	11 kHz A	12.5

VHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC
8	4 kHz D	7.5 kHz	11 kHz A	13
9	11 kHz A	7.5 kHz	4 kHz D	13
10	4 kHz D	7.5 kHz	7.6 kHz D	13
11	4 kHz D	7.5 kHz	16 kHz A	13
12	16 kHz A	7.5 kHz	4 kHz D	13
13	7.6 kHz D	7.5 kHz	11 kHz D	13
14	7.6 kHz D	7.5 kHz	7.6 kHz D	12.5
15	11 kHz A	7.5 kHz	11 kHz A	Cochannel
16	11 kHz A	7.5 kHz	16 kHz A	Cochannel
17	16 kHz A	7.5 kHz	11 kHz A	Cochannel
18	11 kHz A	15 kHz	16 kHz A	12.5
19	16 kHz A	15 kHz	11 kHz A	12.5
20	16 kHz A	15 kHz	16 kHz A	Unknown

Chart 2: Extrapolated Coordination Clearance Criteria

Note: "Cochannel" means that the proposed station is treated as a cochannel for coordination clearance.

Chart 2 includes the "6.25 kHz or Equivalent" coordination standard, as well as the standard derating of adjacent channel narrow cases by 12.5 dBu (this is apparently a LMCC consensus standard which we received no information, but which is commonly now used by all the FACs).

These are the standards used for FB8 trunked applications, and often – apparently - for many Public Safety conventional channels, and which strongly influence the standards for Business/Industrial conventional channels.

The LMCC does not restrict their "6.25 kHz or Equivalent" coordination standard to just trunked channels, so the assumption is that it applies to all coordination situations.

This chart does not include all coordination situations, but it does include the most common emissions and spacing of channels that will occur in the future.

D. Initial Evaluation of Current LMCC Clearance Criteria

Informally, PROS has asked several times how the FACs arrived at these criteria. We have possession of the interference potential report provided by Motorola during their deliberation of the "6.25 kHz or Equivalent" standard[5], as well as a competing table of interference potential generated by one of the two NXDN very narrow band technologies vendors.

After extensive analysis, we could not determine any engineering reason for the adoption of any of the current coordination clearance standards for "6.25 kHz or Equivalent" frequencies.

[5] *Analog & Digital Modulation Interference Performance*, Prepared by David Eierman, Brad Hiben, Kevin Mayginnes, Eric Eppley & Tom Bohn, Motorola, Inc., March 4, 2007

We believe that the 12.5 kHz adjacent channel standard grows out of the FIFTH MEMORANDUM OPINION AND ORDER[6] quoted in B above, involving UTC, which resulted in a 12.5 dBu adjacent channel protection factor for CII channels[7] which were formally exclusively coordinated by their respective FACs. This, however, is just an educated guess.

To evaluate the above chart of coordination criteria, we turned to the TIA/TSB-88 standard, which is the only standard which takes into account the majority of the technologies and emissions currently being coordinated. We specifically asked Peter Moncure of Radiosoft to assist us in constructing a chart which would allow us to accurately determine the most effective and efficient coordination standards, to prevent interference in all of coordination cases listed in Chart 2.

Radiosoft did an analysis of the interference potential for certain combinations of channel spacing and emissions, and calculated the Adjacent Channel Protection Ratio (ACPR). The APCR is "the reduction of the interfering energy … [which allows] an upward adjustment of the interfering contour value or reduction of ERP …".[8]

The results of the calculations are presented in the chart below:

[6] FCC 00-439, PR Docket 92-235, *FIFTH MEMORANDUM OPINION AND ORDER*, Adopted December 14. 2000

[7] Public Notice, DA 02-1319, *WIRELESS TELECOMMUNICATIONS BUREAU ACCEPTS AND APPROVES CONSENSUS ANALYTICAL METHOD FOR DETERMINING ADDITIONAL FREQUENCY COORDINATION REQUIREMENTS FOR CERTAIN PRIVATE LAND MOBILE 150-470 MHz APPLICATIONS* June 6, 2002,

[8] Chart 6, *Alternate Interference Calculation Methodologies*, Bernie Olson, Chair TIA TR8.18, Compatibility, from a presentation at IWCE 2010.

ACPR values in dB from TSB-88.C							
Victim Station	Channel Spacing		Interfering Station				
			4K D	**7.6k D**	**11K A**	**16K A**	**HPD D**
	6.25 kHz	**4K D**	69	28	30	14	7
	6.25 kHz	**7.6k D**	40	20	14.5	8	5
	6.25 kHz	**11K A**	40	12.5	14.5	8	5
	6.25 kHz	**16K A**	3	3	3	3	3
	6.25 kHz	**HPD D**	0	0.1	0.1	0.8	N/A
			4K D	**7.6k D**	**11K A**	**16K A**	**HPD D**
	7.5 kHz	**4K D**	73	37	38.5	21	7
	7.5 kHz	**7.6k D**	61	24	26	11	6
	7.5 kHz	**11K A**	57	21	23	11	5.6
	7.5 kHz	**16K A**	12	6	11	4	4
	7.5 kHz	**HPD D**	0	0.8	0.5	N/A	2.5
			4K D	**7.6k D**	**11K A**	**16K A**	**HPD D**
	12.5 kHz	**4K D**	80	77	78	54.5	52
	12.5 kHz	**7.6k D**	75	67	70	40	35
	12.5 kHz	**11K A**	74	62	66	39	22
	12.5 kHz	**16K A**	71	41	44	23	8
	12.5 kHz	**HPD D**	53	19	20	10	5
			4K D	**7.6k D**	**11K A**	**16K A**	**HPD D**
	15 kHz	**4K D**	81	80	81	73	62
	15 kHz	**7.6k D**	77.5	76	78	61	55
	15 kHz	**11K A**	76	76	77	56	53
	15 kHz	**16K A**	73.5	64	67	39	20
	15 kHz	**HPD D**	71	40	43	21.5	7.5

Chart 3: ACPR Values for Common PLMR Technologies.

Notes:
1. For the 7.6 k emissions, a weighted conservative average was derived from all digital narrowband modulations. More accurate data will allow more accurate calculations.
2. "HPD" is data on 20 kHz channels which meet the "equivalent efficiency" standard for very narrowband operations.
3. The letter "A" after an emission denotes Analog emissions. A "D" denotes Digital emissions.
4. All figures are dB values.

E. Reasonable Clearance Criteria

The use of interference and service contours are well established within the Commission's regulatory licensing system and in use by the FACs. It is relatively well understood, even if not as accurate as some would wish.

TSB88, however, is not as well understood, nor accepted, although both the Commission and the FAC's have agreed to make use of some of its methodology in coordinations in the 470-512 MHz band, and in the 421-430 MHz TV sharing bands.

We can take the ACPR values above, and adapt them to the widely used Part 73.699 R-6602 contours. Using the ACPR values as the more accurate derating factor for the interference contour for adjacent channels, we will end up with a more accurate set of interference contours for the most common coordination cases:

Common Cases Where Interference May Be Present

UHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC	TSB88 ACPR Derating
1	4 kHz D	6.25 kHz	11 kHz A	8	40
2	11 kHz A	6.25 kHz	4 kHz D	8	30
3	4 kHz D	6.25 kHz	7.6 kHz D	8	40
4	4 kHz D	6.25 kHz	16 kHz A	8	3
5	16 kHz A	6.25 kHz	4 kHz D	8	14
6	11 kHz A	12.5 kHz	16 kHz A	12.5	44
7	16 kHz A	12.5 kHz	11 kHz A	12.5	39

VHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC	TSB88 ACPR Derating
8	4 kHz D	7.5 kHz	11 kHz A	13	57
9	11 kHz A	7.5 kHz	4 kHz D	13	38.5
10	4 kHz D	7.5 kHz	7.6 kHz D	13	61
11	4 kHz D	7.5 kHz	16 kHz A	13	12
12	16 kHz A	7.5 kHz	4 kHz D	13	21
13	7.6 kHz D	7.5 kHz	11 kHz D	13	21
14	7.6 kHz D	7.5 kHz	7.6 kHz D	12.5	24
15	11 kHz A	7.5 kHz	11 kHz A	Cochannel	23
16	11 kHz A	7.5 kHz	16 kHz A	Cochannel	11
17	16 kHz A	7.5 kHz	11 kHz A	Cochannel	11
18	11 kHz A	15 kHz	16 kHz A	12.5	67
19	16 kHz A	15 kHz	11 kHz A	12.5	56
20	16 kHz A	15 kHz	16 kHz A	Unk	39

Chart 4: TSB88 Based Adjacent Channel Deratings

Note: "Cochannel" means that the proposed station is treated as a cochannel for coordination clearance.

The most important observation one can make from comparing the LMCC's coordination clearance criteria to the TSB88 generated criteria is the major differences in most of the cases. It is obvious that, the LMCC standards are generally excessively conservative.

The only two cases in which the LMCC standards are not overly conservative are Case 4 and case 11.

The greatest difference is case 18, where there is a 54.5 dB difference between what a FAC will coordinate, and what will actually cause interference to a proposed station.

There are two major problems inherent in the conservative nature of the LMCC and the FACs standards compared to those suggested by the TSB88 based derating factors.

First, these differences are directly translatable into systems which could be coordinated and licensed, but aren't; and to the licensing of systems in a manner which does not maximize the reuse of frequencies within an area, as the LMCC standards are excessively cautious and require much greater separations than would otherwise be required.

Second, the LMCC standard discriminates against more efficient systems (by making them excessively difficult to coordinate), while at the same time protecting wideband systems from any of the degradation that the Commission expected would motivate such users to more adopt more efficient technologies.

Using the TSB88 calculated derating factors would remedy the first of these problems, but not the second.

F. Reflecting Narrowbanding Priorities in the Deratings

We decided to see if we could adjust the TSB88 derating factors to better emphasize what we believe the Commission's priorities are in relation to the ongoing narrow and very narrowbanding efforts.

To determine the adjustments, we used the following general methodology:

1. Advantage the more efficient modulations and systems over the lesser efficient, but do not make the less efficient systems unusable.

2. Give realistic, technically derived interference contour deratings.

3. Protect legacy wide band systems no more than current narrow band systems (in total).

4. The protection of a legacy wide band channel should be one half of it's total narrow channel protection in each case, but is cumulatively equal to the total protection of a 11k channel due to possible interferers on either side of the wider channel.

5. The difference in protection factors in one direction and its reverse is simplified in favor of the more efficient system.

Most modern, quality mobile and portable radios have Selectivity specifications in excess of 60 dB. Most of them are 70 dB or better. Based on this, we chose 60 dB as the preferred “cut off” for whether or not a proposed station could be “Not Affected” for purposes of interference calculations. However, in case 8, we accepted a 3 dB increased degradation in a lesser efficient system in order to prioritize very narrow systems.

Common Cases Where Interference May Be Present

UHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC	TSB88 Based ACPR	Derating Proposed	Derated Contour
1	4 kHz D	6.25 kHz	11 kHz A	8	40	40	61
2	11 kHz A	6.25 kHz	4 kHz D	8	30	28	49
3	4 kHz D	6.25 kHz	7.6 kHz D	8	40	40	61
4	4 kHz D	6.25 kHz	16 kHz A	8	3	20	41
5	16 kHz A	6.25 kHz	4 kHz D	8	14	14	35
6	11 kHz A	12.5 kHz	16 kHz A	12.5	44	40	61
7	16 kHz A	12.5 kHz	11 kHz A	12.5	39	40	61

VHF Case	Proposed Interferer	Channel Spaced at	Existing Victim	Derating LMCC	TSB88 Based ACPR	Derating Proposed	Derated Contour
8	4 kHz D	7.5 kHz	11 kHz A	13	57	N/Affected	
9	11 kHz A	7.5 kHz	4 kHz D	13	38.5	37	56
10	4 kHz D	7.5 kHz	7.6 kHz D	13	61	N/Affected	
11	4 kHz D	7.5 kHz	16 kHz A	13	12	37	56
12	16 kHz A	7.5 kHz	4 kHz D	13	21	14	33
13	7.6 kHz D	7.5 kHz	11 kHz D	13	21	24	43
14	7.6 kHz D	7.5 kHz	7.6 kHz D	12.5	24	24	43
15	11 kHz A	7.5 kHz	11 kHz A	Cochannel	23	21	40
16	11 kHz A	7.5 kHz	16 kHz A	Cochannel	11	6	25
17	16 kHz A	7.5 kHz	11 kHz A	Cochannel	11	Cochannel	
18	11 kHz A	15 kHz	16 kHz A	12.5	67	N/Affected	
19	16 kHz A	15 kHz	11 kHz A	12.5	56	56	75
20	16 kHz A	15 kHz	16 kHz A	Unk	39	?	?

Chart 5: Priority Adjusted TSB88 Deratings and Contours

Notes:
1. "N/Affected" means "Not Affected". This means that no derating contour is required for coordination.
2. "Cochannel" means that the proposed station is treated as a cochannel for coordination clearance.

Attached in Appendix B is a more detailed, specific justification for the particular derating figures, along with additional information consisting of the overlap or guard space in kHz between channels in the different cases, and the percentage of overlap or guard of each station in each situation.

G. Testing the LMCC and Prioritized TSB88 Derating Schema

In order to test this prioritized adjusted TSB88 derating scheme, we turned to systems in which we have been extensively involved, and for which we have first hand knowledge.

In Appendix C are contour analysis studies of the 11 kHz, UHF Public Safety trunked system licensed to the South West Communications Center in Dallas, TX.

Of the fifteen channels assigned to the system, 14 fail current LMCC adjacent channel clearance standards of a 12.5 kHz interference contour derating (a 33.5 dBu interference contour for adjacent wideband channels).

Eight of the 14 channels which failed the LMCC standard, also fails the TSB88 based clearance standard of a 40 dB derating (a 61 dBu interference contour for adjacent wideband channels).

In Appendix D are contour studies of the UHF Business/Industrial trunked 4 kHz system licensed to Nucor Steel in Decatur AL.

This system is exclusively licensed to operate very narrow 4 kHz emission frequencies.

Of the 18 channels involved in the system, only 6 of the assigned frequencies are not on channel centers of frequencies authorized 11k or 16k emissions, and therefore do not fall

under the LMCC “6.25 kHz or Equivalent” coordination census (there were no other very narrow channels within the specified “affected” bandwidth).

Of these six, five do not meet current LMCC clearance standards for "6.25 kHz and Equivalent" channels. Three do not meet the prioritized TSB88 based clearance criteria.

Neither of these systems has received complaints due to adjacent channel interference.

Neither of these systems has received any known interference due to adjacent channel stations.

We are not asserting that there is *no* degradation to the adjacent channels, or from the adjacent channels to the subject systems. We are asserting that it is not of such a magnitude to cause “harmful interference” to the systems involved, as evidenced by the lack of interference issues related to adjacent channel stations.

We have other systems which we would have liked to continue this comparison, but time precluded it.

However, from these two studies, two things seem apparent:

1. The current LMCC clearance criteria are excessively conservative,
2. The prioritized TSB88 derating clearance criteria may be excessively conservative.

H. Causes and Effects of the Conservative LMCC and FACs' Coordination Standards

Taking the UHF trunked system licensed to the South West Regional Communications System discussed earlier, and in Appendix C:

The Southwest Regional Communications Center (SWRCC) provides dispatch services for medical emergency, law enforcement and fire services for the towns of Duncanville, Cedarville and DeSoto in southwest corner of Dallas County Texas under the callsigns WQHI703 and WQHI705.

The SWRCC was originally unable to obtain frequencies, and were told by one Public Safety Coordinator that none were available in any band.

They sought the services of Pros Ltd, and we did a complete analysis of the 800 MHz NSPAC band, the 800 MHz Public Safety band, the 470-512 MHz TV sharing band, the 450 MHz band, and the 150 MHz band. At the time, 700 MHz channels were not available in this area.

No frequencies were available in any band, in accordance with the standard LMCC clearance standards. However, the SWRCC required a trunking system, and therefore any application would fall under the then current 90.187 spectral overlap/affected licensee rules.

A review of the 450 MHz band revealed sufficient channels to build the required system, but only with 11.2 kHz channels, many of which were immediately adjacent to the City of Dallas's conventional wide band channels in the same band.

Two applications were submitted. One was in the SWRCC's name, the second in the City of Duncanville's name.

The first application for ten channels was originally submitted to one of the four Public Safety coordinators, who received objections to all ten channels, seven of them due to adjacent channel wide band users.

The second application in Duncanville's name for five channels received objections on four of the channels for adjacent wide band users.

It was requested that the applications be forwarded to the FCC over the adjacent channel objections, referencing the 90.187(b)(2)(iii)(B) "affected licensees" rule, which eliminated the objections as contrary to FCC rules.

The original coordinator declined.

Both applications were pulled from this coordinator and sent to a third Public Safety coordinator, and again received the same objections. This time, the applications were sent

to the FCC in accordance with FCC rules, the licenses granted and the system constructed.

The system has been providing public safety communications for these three cities for almost three years now, with no notice of objectionable interference from any adjacent channel user.

Implications of the SWRCC Experience

This system would not have been licensed and constructed without resort to the spectral clearance rules of 90.187 as written, and under the proposed 90.187 spectral overlap rules (combined with current LMCC consensus coordination standards) could not be licensed at all, until after the 2013 narrow band deadline – if ever.

Rule Part 90.175(a) states:

> *... Additionally, applicants bear the burden of proceeding and the burden of proof in requesting the Commission to overturn a coordinator's recommendation.*

Because of this regulatory guidance, an applicant is in an inherently unequal power situation in reference to a coordinator's recommendation.

The FACs' have a single mandate from the FCC: recommend the frequencies least likely to cause interference to other users and that otherwise meet the regulatory guidelines of the FCC.

However, upon analysis, this can be broken down into two conflicting goals:

1. Prevent interference and
2. Recommend frequencies.

Since one of a FAC's main missions is to prevent interference, and the burden of proof will always rest with the applicant, it is inherently a lower risk organizational strategy for the FACs to *not* recommend any application which bears the slightest possibility of a complaint of interference and improper coordination.

This leads to an excessively cautious approach to coordination standards, and can not be changed absent clear guidance or standards from the FCC.

In fact, this lack of clear priorities and regulatory guidelines to the FACs explains, to a great extent, the reason that the degradation of wideband systems due to narrower systems has not had the effect anticipated by the FCC: the FACs coordination procedures have mostly prevented such degradation, as their clear mandate requires.

I. Results of the Proposed 90.187 Spectral Overlap Change, Combined With Current FCC Guidance to the FACs

While we are only about 36 months away from the final deadline for conversion of all PLMR equipment to narrow (12.5 kHz) efficiency, and an untold number of years away from the final conversion to 6.25 kHz or equivalent efficiency, the change to the Spectral Overlap criteria by the FCC and the conservative nature of the LMCC coordination

process will result in even less motivation and reasons to convert to more efficient systems than has been previously the case.

The FCC is faced with three basic courses of action:

1. Approve the LMCC recommended changes to the Spectral Overlap standard, and do nothing else. Allow the FACs to continue to use their conservative coordination guidelines and procedures, causing an even slower transition to narrower, more efficient technologies, or

2. Approve the LMCC recommended changes to the Spectral Overlap standard, and additionally, go back to the original Refarming Report and Order[9] and establish clear adjacent channel interference criteria to guide the FACs, and establish FCC guidelines on the Commissions priorities in respect to narrowbanding, or

3. Leave the Spectral Overlap rules just as they are (discarding that specific proposed change), and give the FACs clear and unambiguous guidance that the

[9] Section 3, paras 76 "Adjacent Channel Separations" .FCC 92-235 , PR Docket No. 92-235 *REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULE MAKING* Adopted: June 15, 1995:

> After this date we will require the appropriate frequency coordinators to review applications for adjacent channel usage and determine appropriate separation distances based upon the technical characteristics of proposed and existing station(s). *We will revisit this issue if the land mobile community believes specific adjacent channel station distance separations are needed.*

rule was meant to advantage more efficient and narrower systems at the expense of wider, less efficient systems.

Regardless of the course of action chosen, or even if another is proposed in the discussion of these comments, the one clear requirement is that the FCC establishes and communicates their priorities to both the FACs and the industry.

J. Recommendation

Our interim suggestion is to keep the current Spectral Overlap rule, and specifically remove the phrase *"(and filers of previously filed pending applications) with an assigned (or proposed),* so that applications can continue to be processed, coordinated, and granted.

In the meantime, the Commission needs to determine the priorities and guidance it wishes to promote, and any methods that may be required to best balance the long term interests of the industry.

This course of action immediately returns to applicants the ability to apply for, and acquire the frequencies for more efficient systems, puts wide band users on notice – once again – that they are subject to increasing degradation of their systems as long as they continue to operate in a less efficient manner, and tells the FACs the initial intent of the FCC.

The time frame is particularly critical, now that we are almost in the last 36 months prior to the Jan 1, 2013 deadline to the final implementation of the 12.5 kHz narrowband portion of this transition. Many end users are currently making financial and operational decisions which can have an impact on into the period in which the FCC may wish to establish a date for final transition to very narrow band systems.

It also gives the opportunity for a considered discussion of the long term implications of the policies and priorities of the FCC, with several years of experience with the current round of narrowband transitions.

Respectfully submitted,

PROS Ltd

3651 Peachtree Parkway, Suite E-111
Suwanee, GA 30024-6009

May 13, 2010

Appendix A:
Request for Coordination Standards

On April 21st, 2010, a letter was sent via the US Postal to the headquarters of the LMCC requesting information about coordination clearance agreements and standards (copy attached)

A substantially similar email was also addressed to Al Ittner, the current LMCC President.

Mark Crosby for the LMCC responded with copies of the LMCC's "6.25 kHz or Equivalent" coordination standard, and their position paper on the coordination of trunked systems mobile units.

He stated that there was no other LMCC consensus agreement, but that each FAC had its own coordination criteria, and suggested that I contact them directly.

The next week (April 27th, 2010) , PROS send a similar letter to each of the FAC's listed below. The contact information for each FAC was taken from the FCC's website.

Two of the 10 FAC's contacted responded: UTC and AAR.

Within their allocation of VHF channels, the AAR and their rail frequency coordination procedures are substantially different than other FACs, and is not pertinent to the rest of the discussion.

In an email, UTC provided a copy of the LMCC approved "6.25 kHz or Equivalent" coordination standard and discussed briefly and in non-technical terms the differences between Public Safety FAC's and Business/Industrial FACs.

No other information was received from any FAC, or the LMCC.

Requests for information sent to the following::

Association of Public-Safety Communications Officials, Inc. (APCO)
International Municipal Signal Association (IMSA)
Forestry Conservation Communications Association (FCCA)
American Association of State Highway and Transportation Officials (AASHTO)
Enterprise Wireless Alliance (EWA)
Forest Industries Telecommunications (FIT)
Manufacturers Radio Frequency Advisory Committee, Inc. (MRFAC)
PCIA/IAFC/IMSA
UTC Spectrum Services
Association of American Railroads (AAR)
Frequency Coordination

Appendix A:
Request for Coordination Standards

Copy of letter sent to:

Land Mobile Communications Council
Attn: President
8484 Westpark Drive
Suite 630
McLean, VA 22102

PROS Ltd

April 21st, 2010

Land Mobile Communications Council
Attn: President
8484 Westpark Drive
Suite 630
McLean, VA 22102

Subject: Coordination Standards for the 150 MHz and 450 MHz bands

Sir;

I am requesting that the LMCC provide their agreed upon clearance criteria (in derated interference contours of the proposed station) for adjacent channel clearance. and their reverse.

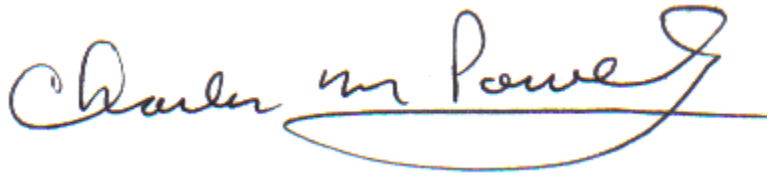
I am willing to cover any appropriate costs for you to do so. Just let me know the amount and payment method you prefer.

This is for the VHF (150-174 MHz) and UHF (450-470 MHz) bands, for both Public Safety and Business (if they are different), and for shared and exclusive use channels (if they are different).

I can only assume that this information and standards are easily available, as your organization uses these on a daily basis. if some (or all) of the information is not available, if you could let me know which situations, and why the information isn't available, I would also appreciate it. If you anticipate that some time will be required to gather this information, however, please let me know when I might expect it to be available.

An emailed or faxed copy would be appreciated.

Sincerely,



Charles Powell
Pros Ltd

270-776-1601 Mobile
charlie@prosltd.com

Attachments:

1. 1st and 2nd Adjacent channels
2. Coordination Standards form

Attachment 1
1st and 2nd Adjacent Very Narrow Channels

UHF

In this case is that there are five possible 6.25 kHz spaced channels which will impact the bandwidth of any 25 kHz spaced channel. These five channels can be broken down into three categories: center frequencies, 1st adjacent channel, and 2nd adjacent channel. Taking the 460.150 MHz 25 kHz channel as an example, these five 6.25 kHz channels would be:

Center channel:

460.150 MHz (25 kHz channel center)

1st Adjacents:

Lower: 460.14375 MHz (6.25 kHz channel center)
Upper: 460.15625 MHz (6.25 kHz channel center)

2nd Adjacents:

Lower: 460.1375 MHz (12.5 kHz channel center)
Upper: 460.1625 MHz (12.5 kHz channel center)

VHF

There are five possible 7.5 kHz spaced channels which will impact the bandwidth of any 30 kHz spaced channel. These five channels can be broken down into three categories: center frequencies, 1st adjacent channel, and 2nd adjacent channel. Taking the 151.025 MHz 30 kHz spaced channel as an example, these five 7.5 kHz channels would be:

Center channel:

151.025 MHz (15 kHz spaced channel center)

1st Adjacents:

Lower: 151.0175 MHz (7.5 kHz spaced channel center)
Upper: 151.0325 MHz (7.5 kHz spaced channel center)

2nd Adjacents:

Lower: 151.010 MHz (15 kHz spaced channel center)
Upper: 151.040 MHz (15 kHz spaced channel center)

Attachment 2
LMCC Coordination De-rating Standards

Public Safety Frequency Bands

Case	Shared Use		Exclusive Use	
	Stated Case	Reverse	Stated Case	Reverse
Public Safety				
UHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
A proposed 4 kHz against an adjacent channel 7.6 kHz				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against a 16.2 kHz channel				
A proposed 7.6 kHz against an adjacent channel 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent channel 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent channel 16.2 kHz channel				
VHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against a 11.2 kHz adjacent channel				
A proposed 4 kHz against a 16.2 kHz adjacent channel				
A proposed 7.6 kHz against a 7.6 kHz adjacent channel				
A proposed 7.6 kHz against a 8.3 kHz adjacent channel				
A proposed 7.6 kHz against a 11.2 kHz adjacent channel				
A proposed 7.6 kHz against an adjacent channel 16.2 kHz channel				
A proposed 8.3 kHz against a 11.2 kHz adjacent channel				
A proposed 8.3 kHz against an 16.2 kHz channel 1st adjacent channel				
A proposed 8.3 kHz against an 16.2 kHz channel 2nd adjacent channel				
A proposed 11.2 kHz against an adjacent channel 16.2 kHz channel				

Attachment 2
LMCC Coordination De-rating Standards

Business Frequency Bands

Case	Shared Use		Exclusive Use	
	Stated Case	Reverse	Stated Case	Reverse
Business				
UHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
A proposed 4 kHz against an adjacent channel 7.6 kHz				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against a 16.2 kHz channel				
A proposed 7.6 kHz against an adjacent channel 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent channel 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent channel 16.2 kHz channel				
VHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against a 11.2 kHz adjacent channel				
A proposed 4 kHz against a 16.2 kHz adjacent channel				
A proposed 7.6 kHz against a 7.6 kHz adjacent channel				
A proposed 7.6 kHz against a 8.3 kHz adjacent channel				
A proposed 7.6 kHz against a 11.2 kHz adjacent channel				
A proposed 7.6 kHz against an adjacent channel 16.2 kHz channel				
A proposed 8.3 kHz against a 11.2 kHz adjacent channel				
A proposed 8.3 kHz against an 16.2 kHz channel 1st adjacent channel				
A proposed 8.3 kHz against an 16.2 kHz channel 2nd adjacent channel				
A proposed 11.2 kHz against an adjacent channel 16.2 kHz channel				

Appendix A:
Request for Coordination Standards

Copy of Letters Sent to FACs:

PROS Ltd

April 27th, 2010

UTC Spectrum Services
1901 Pennsylvania Ave., N.W.
Suite 500
Washington, DC 20006

Subject: Coordination Standards for the 150 MHz and 450 MHz bands

Sir/Ma'am;

I am requesting the clearance criteria (preferably in derated interference contours of a proposed station) for adjacent channel clearance. and their reverse. If you commonly use other criteria, then that information would be helpful, along with at least a cite to the regulatory source, or the consensus document (if known)

I am familiar with the Part 90 rules, and am aware of the recent LMCC 6.25 kHz licensing consensus. This reason for this request is in order to ensure accuracy in my upcoming comments to FCC proposed rulings in WP Docket No. 07-100. I have already requested this information directly from the LMCC, but have been informed that only its individual member FACs' make coordination decisions, and therefore I am directly requesting this information for each member FAC.

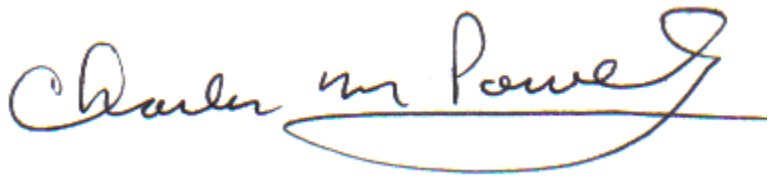
I am willing to cover any appropriate costs for you to do so. Just let me know the amount and payment method you prefer.

This is for the VHF (150-174 MHz) and UHF (450-470 MHz) bands, for both Public Safety (if you coordinate Public Safety channels) and Business (if you coordinate Business channels), and for shared and exclusive use channels (if they are different).

I can only assume that this information and standards are readily available, as your organization uses these on a daily basis. if some (or all) of the information is not available, if you could let me know which situations, and why the information isn't available, I would also appreciate it. If you anticipate that some time will be required to gather this information, however, please let me know when I might expect it to be available.

An emailed or faxed copy would be appreciated.

Sincerely,



Charles Powell
Pros Ltd

270-776-1601 Mobile
charlie@prosltd.com

Attachments:

1. 1st and 2nd Adjacent channels
2. Coordination Standards form

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1st and 2nd Adjacent Very Narrow Channels

UHF

In this case is that there are five possible 6.25 kHz spaced channels which will impact the bandwidth of any 25 kHz spaced channel. These five channels can be broken down into three categories: center frequencies, 1st adjacent channel, and 2nd adjacent channel. Taking the 460.150 MHz 25 kHz channel as an example, these five 6.25 kHz channels would be:

Center channel:

460.150 MHz (25 kHz channel center)

1st Adjacents:

Lower: 460.14375 MHz (6.25 kHz channel center)
Upper: 460.15625 MHz (6.25 kHz channel center)

2nd Adjacents:

Lower: 460.1375 MHz (12.5 kHz channel center)
Upper: 460.1625 MHz (12.5 kHz channel center)

VHF

There are five possible 7.5 kHz spaced channels which will impact the bandwidth of any 30 kHz spaced channel. These five channels can be broken down into three categories: center frequencies, 1st adjacent channel, and 2nd adjacent channel. Taking the 151.025 MHz 30 kHz spaced channel as an example, these five 7.5 kHz channels would be:

Center channel:

151.025 MHz (15 kHz spaced channel center)

1st Adjacents:

Lower: 151.0175 MHz (7.5 kHz spaced channel center)
Upper: 151.0325 MHz (7.5 kHz spaced channel center)

2nd Adjacents:

Lower: 151.010 MHz (15 kHz spaced channel center)
Upper: 151.040 MHz (15 kHz spaced channel center)

Case	Shared Use		Exclusive Use	
	Stated Case	Reverse	Stated Case	Reverse
Public Safety				
UHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
Example: 460.13125 (4 kHz) against 460.125 (16.2 kHz)				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
Example: 460.1375 (4 kHz) against 460.125 (16.2 kHz)				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 8.3 kHz channel				
A proposed 7.6 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent 11.2 kHz channel				
A proposed 8.3 kHz against an adjacent 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent 11.2 kHz channel				
A proposed 11.2 kHz against an adjacent 16.2 kHz channel				
VHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
Example: 151.0325 (4 kHz) against 151.025 (16.2 kHz)				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
Example: 151.040 (4 kHz) against 151.025 (16.2 kHz)				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 7.6 kHz channel				
A proposed 7.6 kHz against an adjacent 8.3 kHz channel				
A proposed 7.6 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent 11.2 kHz channel				
A proposed 8.3 kHz against an adjacent 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent 16.2 kHz channel				

Case	Shared Use		Exclusive Use	
	Stated Case	Reverse	Stated Case	Reverse
Business				
UHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
Example: 460.13125 (4 kHz) against 460.125 (16.2 kHz)				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
Example: 460.1375 (4 kHz) against 460.125 (16.2 kHz)				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 8.3 kHz channel				
A proposed 7.6 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent 11.2 kHz channel				
A proposed 8.3 kHz against an adjacent 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent 11.2 kHz channel				
A proposed 11.2 kHz against an adjacent 16.2 kHz channel				
VHF:				
A proposed 4 kHz 1st adjacent against a 16.2 kHz channel				
Example: 151.0325 (4 kHz) against 151.025 (16.2 kHz)				
A proposed 4 kHz 2nd adjacent against a 16.2 kHz channel				
Example: 151.040 (4 kHz) against 151.025 (16.2 kHz)				
A proposed 4 kHz against an adjacent 7.6 kHz channel				
A proposed 4 kHz against an adjacent 8.3 kHz channel				
A proposed 4 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 7.6 kHz channel				
A proposed 7.6 kHz against an adjacent 8.3 kHz channel				
A proposed 7.6 kHz against an adjacent 11.2 kHz channel				
A proposed 7.6 kHz against an adjacent 16.2 kHz channel				
A proposed 8.3 kHz against an adjacent 11.2 kHz channel				
A proposed 8.3 kHz against an adjacent 16.2 kHz channel				
A proposed 11.2 kHz against an adjacent 16.2 kHz channel				

Appendix B
Justification For Derating Choices

Band	Case	Interferer	Type	Channel Spacing	Victim	Type	Derating LMCC	TSB88 Ix Factor	Derating Proposed	Derated Contour	Overlap kHz	% of Victim	% Interferer	Rationale on Proposed Derating
UHF	1	4	kHz D	6.25 kHz	11	kHz A	8	40	40	61	0.7	6.4	17.5	Actual: No disadvantage to VN
UHF	2	11	kHz A	6.25 kHz	4	kHz D	8	30	28	49	0.7	17.5	6.4	Slight disadvantge N over VN
UHF	3	4	kHz D	6.25 kHz	7.6	kHz D	8	**40**	**40**	**61**	-0.45	-5.9	-11.3	Actual: No advantage or disadvantage from VN over VN
UHF	4	4	kHz D	6.25 kHz	16	kHz A	8	3	20	41	3.1	19.4	77.5	Transitional: 1/2 of 11k (cumlative, both sides of wide channel)
UHF	5	16	kHz A	6.25 kHz	4	kHz D	8	14	14	35	3.1	77.5	19.4	Transitional: Actual - Disadvantages wide.
UHF	6	11	kHz A	12.5 kHz	16	kHz A	12.5	44	40	61	1.2	7.5	10.9	Transitional: Normalized to reverse - Advantages VN
UHF	7	16	kHz A	12.5 kHz	11	kHz A	12.5	39	40	61	1.2	10.9	7.5	Transitional: Normalized to reverse - Advantages VN
VHF	8	4	kHz D	7.5 kHz	11	kHz A	13	57	N/Affected		0.1	0.9	2.5	Slight advantage to VN.
VHF	9	11	kHz A	7.5 kHz	4	kHz D	13	38.5	37	56	0.1	2.5	0.9	Slight advantage of VN over N
VHF	10	4	kHz D	7.5 kHz	7.6	kHz D	13	61	N/Affected		-1.7	-22.4	-42.5	No advantage VN over VN
VHF	11	4	kHz D	7.5 kHz	16	kHz A	13	12	37	56	2.6	16.3	65.0	Transitional: Same advantage as N to VN. VN should expect acute interference.
VHF	12	16	kHz A	7.5 kHz	4	kHz D	13	21	14	33	2.6	65.0	16.3	Transitional: Advantages VN over W
VHF	13	7.6	kHz D	7.5 kHz	11	kHz D	13	21	**24**	43	0.9	8.2	11.8	Slight advantage to VN over N
VHF	14	7.6	kHz D	7.5 kHz	7.6	kHz D	12.5	24	**24**	43	0.1	1.3	1.3	Actual: No advantage or disadvantage from VN to VN
VHF	15	11	kHz A	7.5 kHz	11	kHz A	Cochannel	23	21	40	3.7	33.6	33.6	Slight but equal degradation - advantages VN
VHF	16	11	kHz A	7.5 kHz	16	kHz A	Cochannel	11	6	25	6.2	38.8	56.4	Transitional
VHF	17	16	kHz A	7.5 kHz	11	kHz A	Cochannel	11	Cochannel		6.2	56.4	38.8	Transitional
VHF	18	11	kHz A	15 kHz	16	kHz A	12.5	67	N/Affected		-1.3	-8.1	-11.8	Transitional
VHF	19	16	kHz A	15 kHz	11	kHz A	12.5	56	56	75	-1.3	-11.8	-8.1	Transitional
VHF	20	16	kHz A	15 kHz	16	kHz A	Unk	39	90.173		1.2	7.5	7.5	Transitional

Appendix C
Derating Contour Comparison Case
South West Communications Center

This is a comparison of the LMCC and the Prioritized TSB88 based clearance criteria for narrow UHF 11 kHz analog channels spaced 12.5 kHz from wide 16 kHz analog channels.

The South West Regional Communications Center is located in the heavily congested area of Dallas County TX (Metro Dallas). This system is authorized to operate under callsigns WQHI703 and WQHI705.

The system was constructed and placed into operation on or before 05/29/2008.

The system consists of 3 sites, and has 5 UHF 11 kHz channels per site. The system is a centralized trunked system, requiring a dedicated control channel on each site. The control channels rotate every 24 hours, so each frequency on each site stays in continuous carrier mode for an average of 73 days a year.

Of the fifteen channels assigned to the system, 14 fail current LMCC adjacent channel clearance standards of a 12.5 kHz interference contour derating (a 33.5 dBu interference contour for adjacent wideband channels).

Eight of the 14 channels which failed the LMCC standard, also fails the TSB88 based clearance standard of a 40 dB derating (a 61 dBu interference contour for adjacent wideband channels).

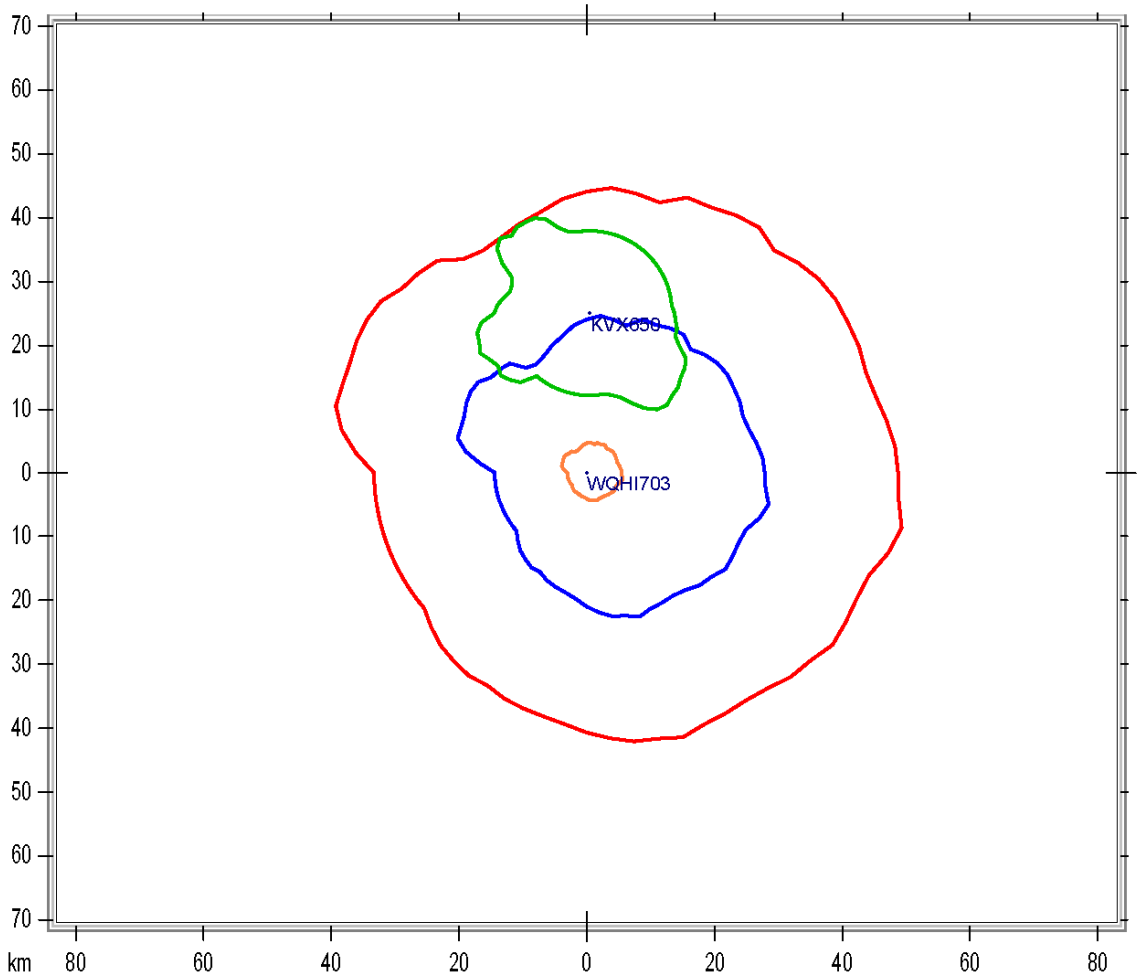
This system has received no known complaints due to adjacent channel interference.
This system has received no known interference due to adjacent channel stations.

Notes for all studies:

1. Only pertinent existing adjacent stations are included.
2. Some data has been rounded in this presentation for clarity. The graphics were generated with the more precise data.
3. Below each graphic, the yellow highlighted station is the "interferer". All other stations are adjacent channel stations.
4. Some emissions have been redacted for space.

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 3 453.3625 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

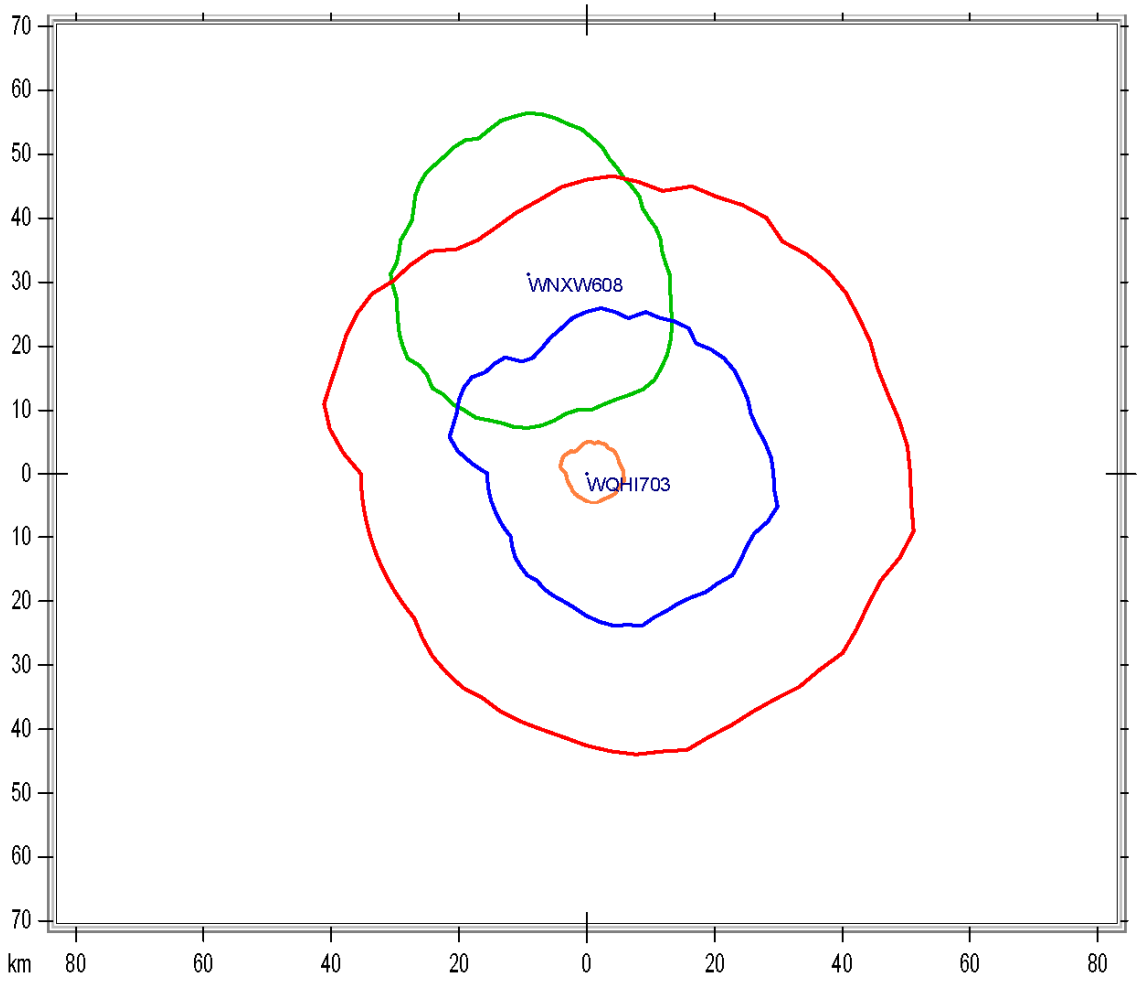
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQHI703	11K2F3E	453.3625	0	80	FB8	196	52	63	32-35-18.0 N	96-50-43.0 W
KVX650	11K2F3E 20K0F3E	453.35	25	185	FB2	130	51	33	32-48-48.0 N	96-50-25.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 3 453.3875 11k and 16k Adjacents



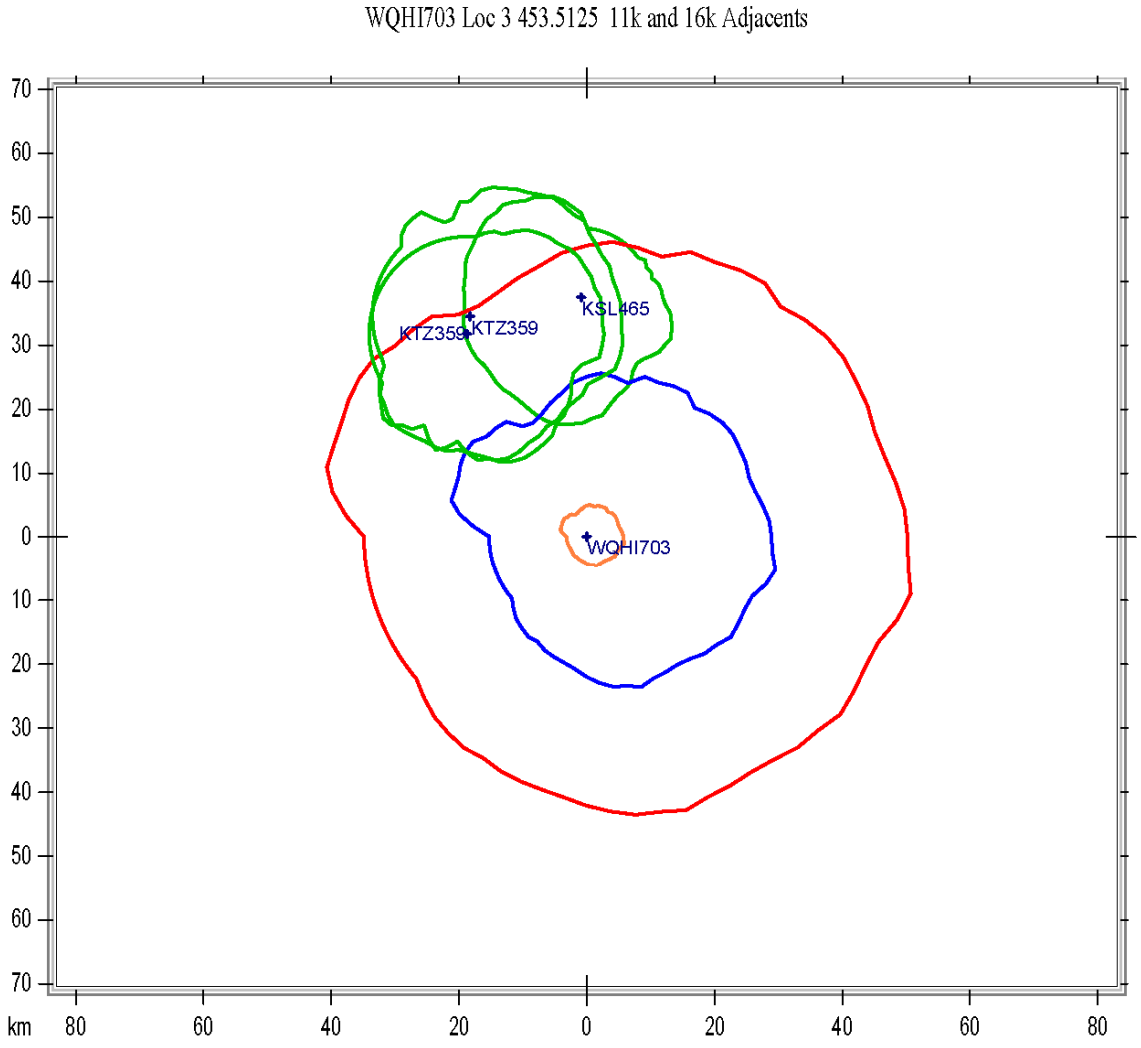
Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQHI703	11K2F3E	453.3875	0	100	FB8	196	52	63	32-35-18.0 N	96-50-43.0 W
WNXW608	20K0F3E	453.4	32	200	FB2	133	99	85	32-52-09.0 N	96-56-35.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center



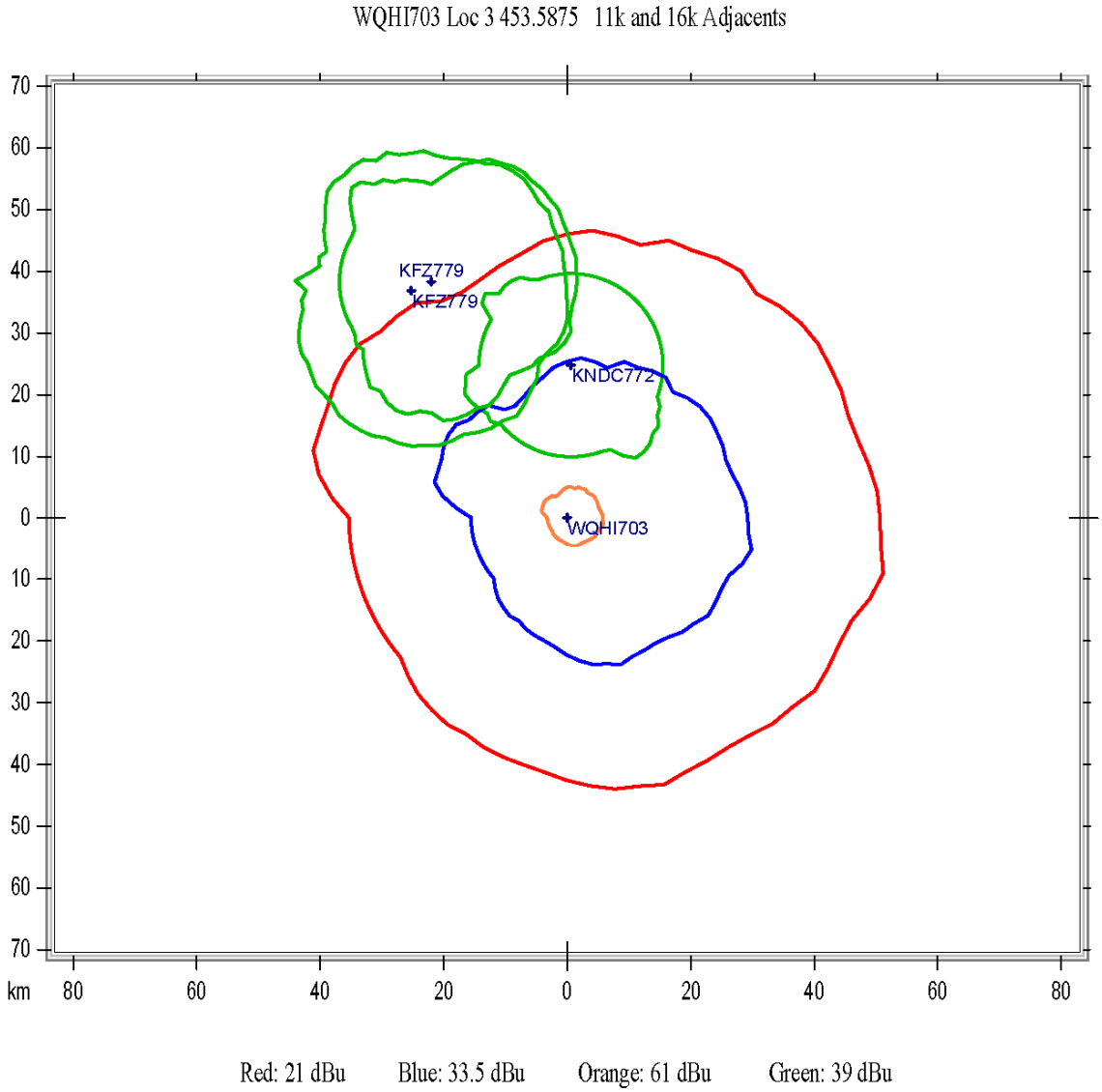
Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
KSL465	20K0F3E	453.5	37	90	FB	178	48	63	32-55-31.0 N	96-51-16.0 W
WQHI703	11K2F3E	453.5125	0	95	FB8	196	52	63	32-35-18.0 N	96-50-43.0 W
KTZ359	20K0F3E	453.525	37	350	FB2	170	24	34	32-52-25.0 N	97-02-44.0 W
KTZ359	20K0F3E	453.525	39	350	FB2	176	30	46	32-53-54.0 N	97-02-25.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

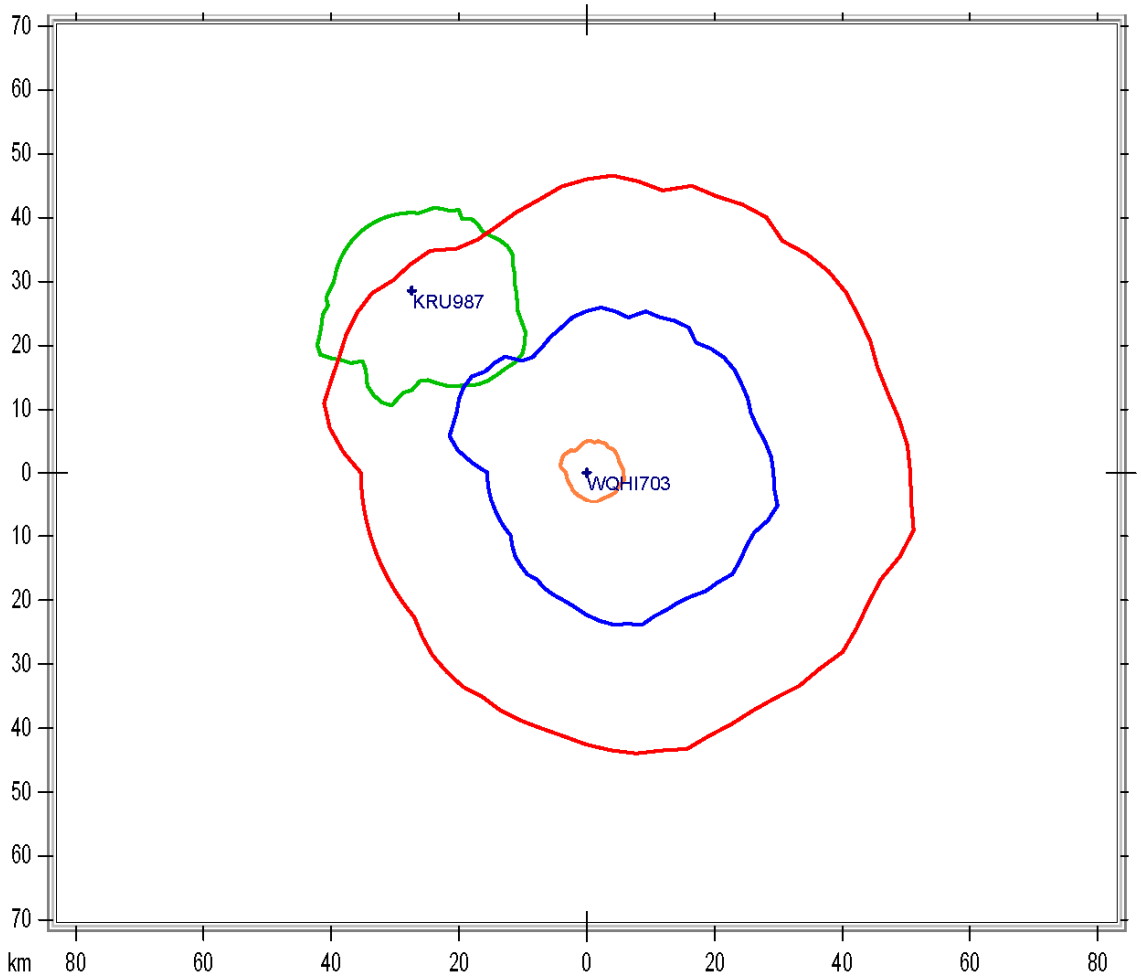
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
KNDC772	20K0F3E	453.575	25	320	FB2	137	30	20	32-48-39.0 N	96-50-19.0 W
KFZ779	20K0F9W	453.575	44	316	FB	195	23	47	32-55-57.0 N	97-04-49.0 W
KFZ779	20K0F3E	453.575	45	316	FB2	187	56	68	32-55-11.0 N	97-06-54.0 W
WQHI703	11K2F3E	453.5875	0	100	FB8	196	52	63	32-35-18.0 N	96-50-43.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 3 453.7625 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

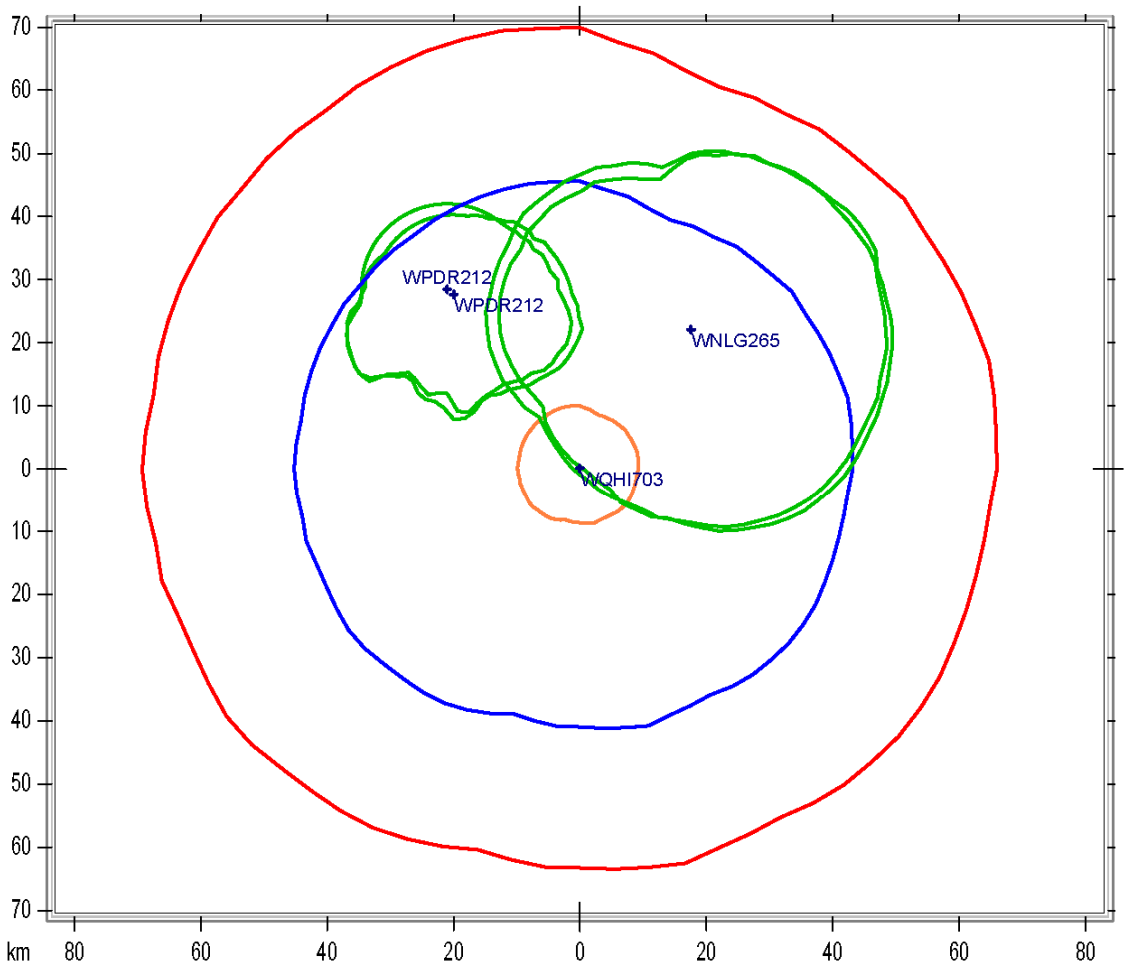
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQHI703	11K2F3E	453.7625	0	100	FB8	196	52	63	32-35-18.0 N	96-50-43.0 W
KRU987	20K0F3E	453.7500	39.51	148	FB2	183	30	41	32-50-42.0 N	97-08-15.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 1 460.0375 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

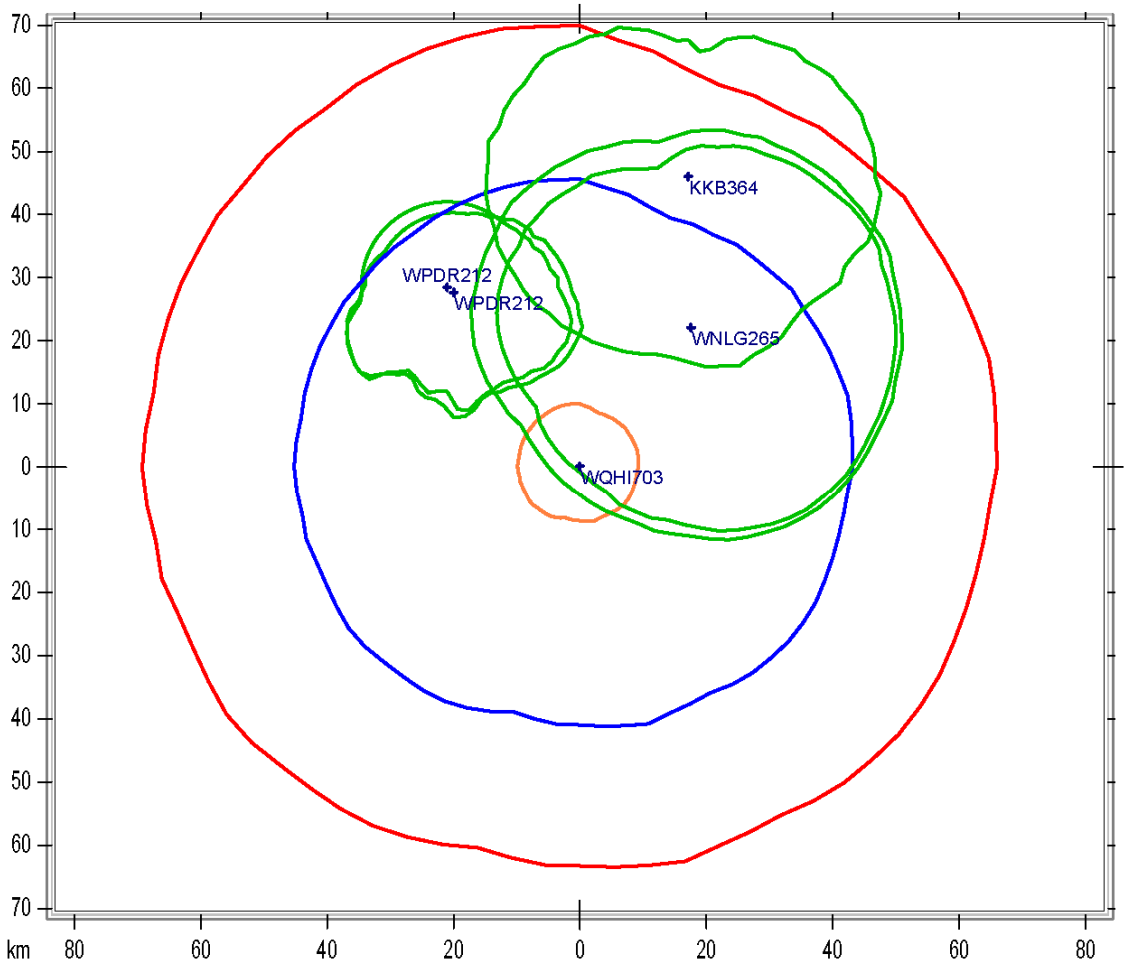
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WNLG265	20K0F3E	460.025	28	400	FB2	141	122	116	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.025	29	450	FB2	138	114	107	32-46-41.0 N	96-45-30.0 W
WQHI703	11K2F3E	460.0375	0	151	FB8	249	169	227	32-35-03.0 N	96-57-49.0 W
WPDR212	20K0F3E	460.05	34	171	FB2	178	43	46	32-49-57.0 N	97-10-37.0 W
WPDR212	20K0F3E	460.05	35	225	FB2	178	35	33	32-50-24.0 N	97-11-16.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 1 460.1625 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

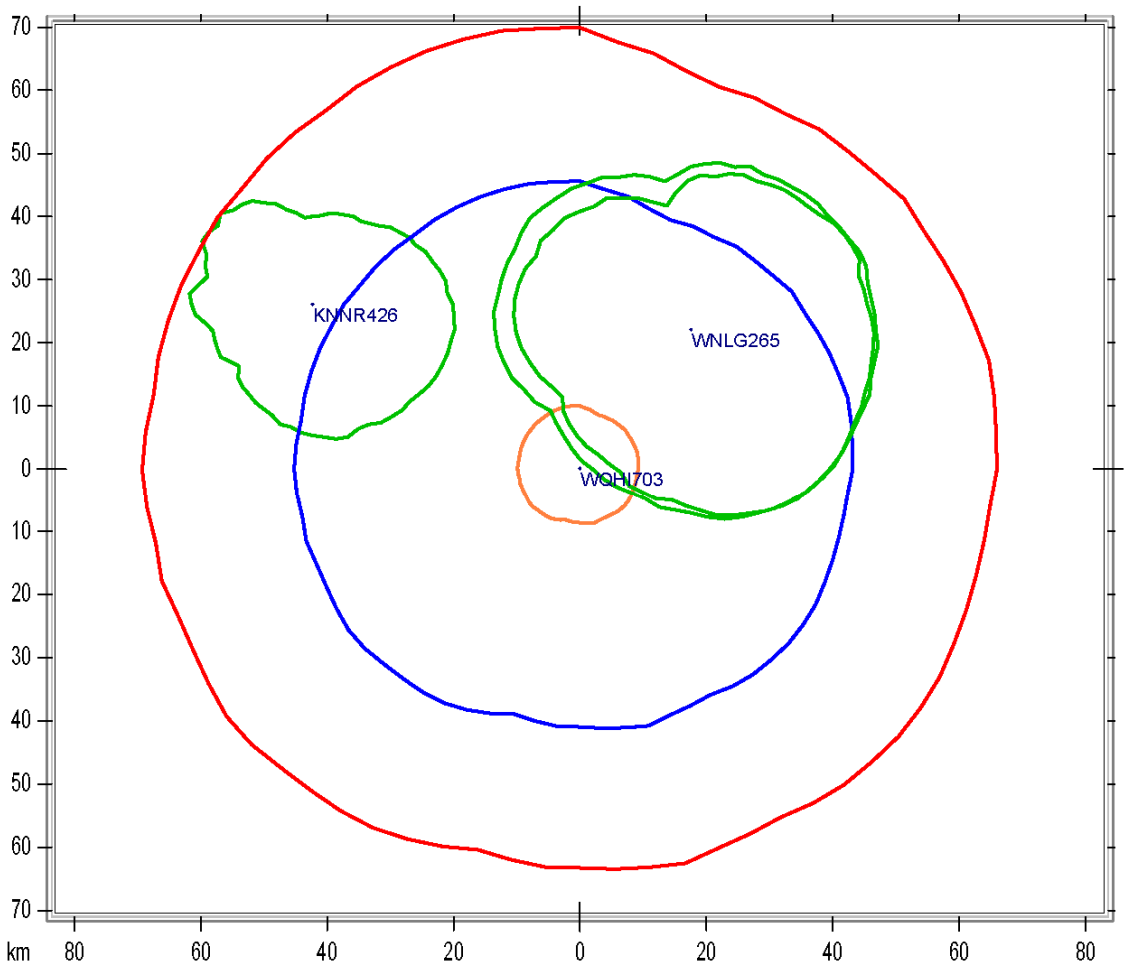
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WPDR212	20K0F3E	460.15	34	171	FB2	178	43	46	32-49-57.0 N	97-10-37.0 W
WPDR212	20K0F3E	460.15	35	225	FB2	178	35	33	32-50-24.0 N	97-11-16.0 W
WQHI703	11K2F3E	460.1625	0	151	FB8	249	169	227	32-35-03.0 N	96-57-49.0 W
WNLG265	20K0F3E	460.175	28	400	FB2	141	152	146	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.175	29	370	FB2	138	132	125	32-46-41.0 N	96-45-30.0 W
KKB364	20K0F3E	460.175	49	700	FB2	209	52	74	32-59-53.0 N	96-46-48.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 1 460.2375 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

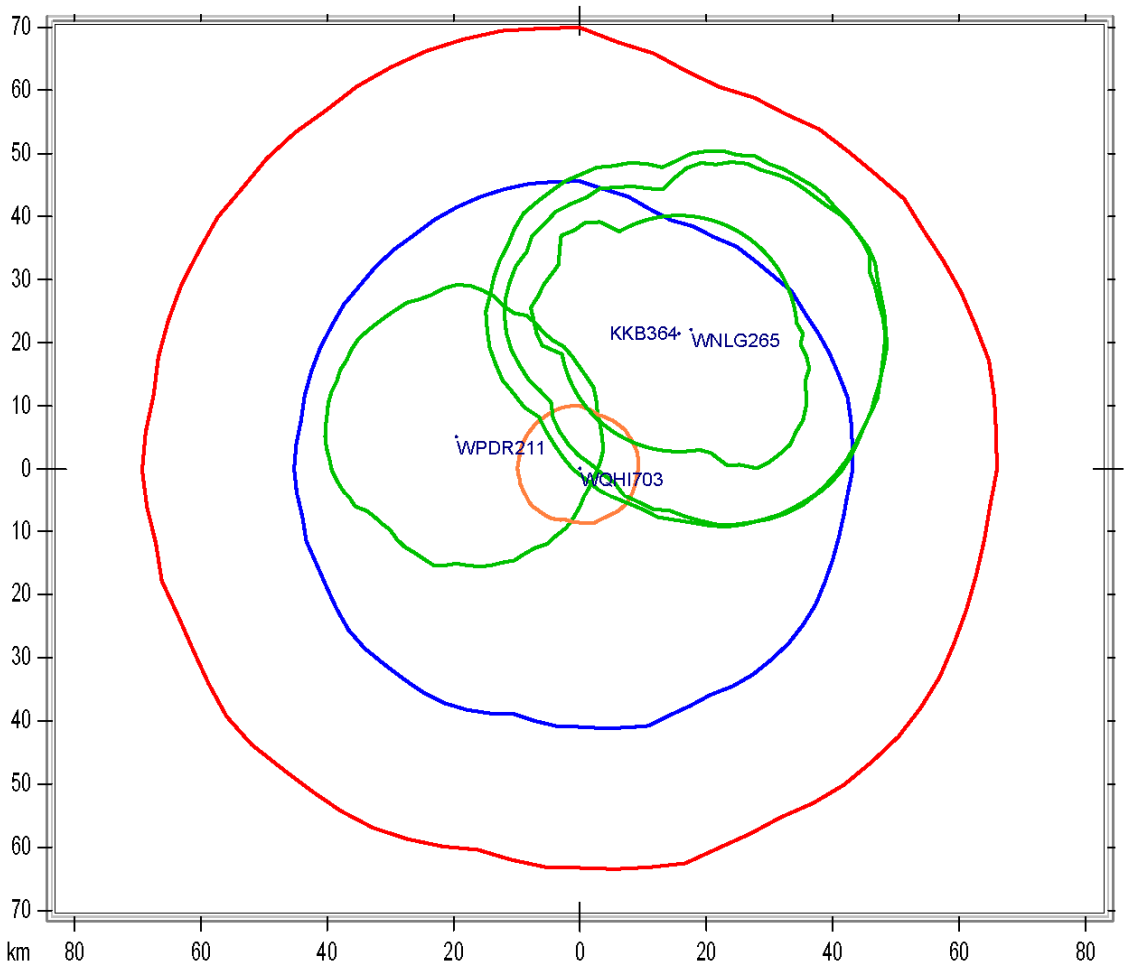
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WNLG265	20K0F3E	460.225	28	400	FB2	141	107	101	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.225	29	425	FB2	138	93	86	32-46-41.0 N	96-45-30.0 W
WQHI703	11K2F3E	460.2375	0	151	FB8	249	169	227	32-35-03.0 N	96-57-49.0 W
KNNR426	20K0F3E 11K2F3E	460.25	50	98	FB2	234	55	84	32-49-06.0 N	97-24-56.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 1 460.3125 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

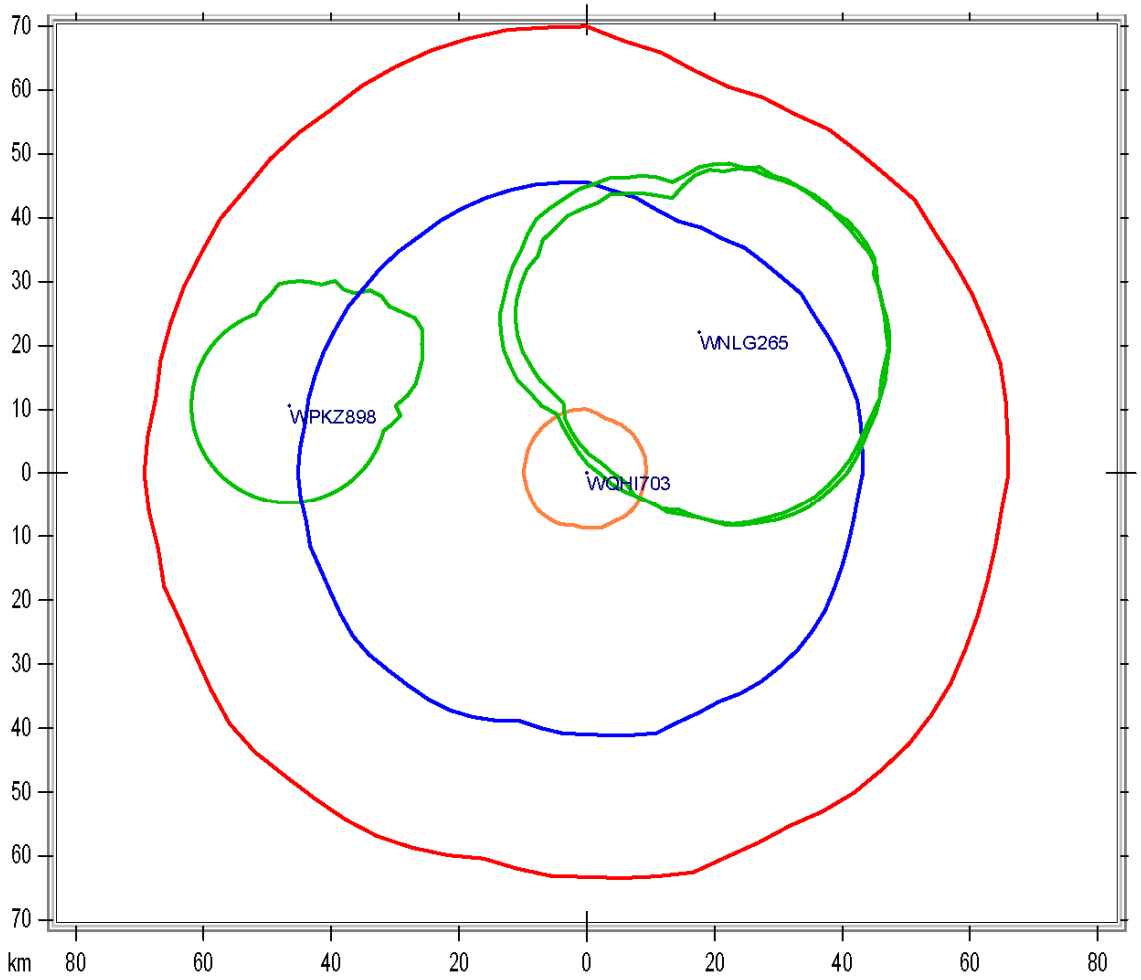
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WPDR211	16K0F1D	460.3	20	95	FB2	206	91	107	32-37-46.0 N	97-10-20.0 W
WQHI703	11K2F3E	460.3125	0	151	FB8	249	169	227	32-35-03.0 N	96-57-49.0 W
KKB364	20K0F3E	460.325	27	700	FB2	138	36	25	32-46-36.0 N	96-47-46.0 W
WNLG265	20K0F3E	460.325	28	400	FB2	141	122	116	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.325	29	450	FB2	138	104	97	32-46-41.0 N	96-45-30.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI703 Loc 1 460.4625 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

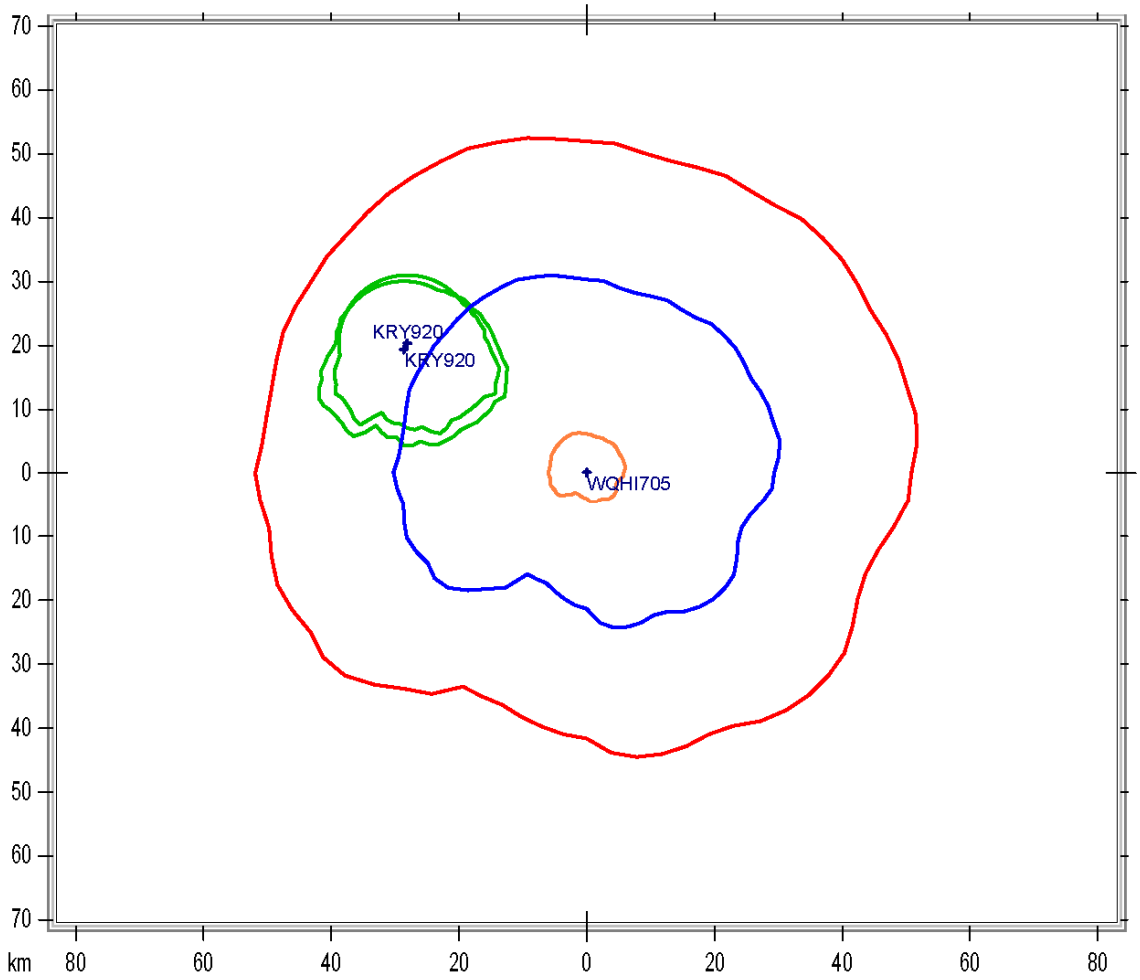
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WPKZ898	20K0F3E	460.45	48	354	FB2	214	36	21	32-40-43.0 N	97-27-40.0 W
WQHI703	11K2F3E	460.4625	0	151	FB8	249	169	227	32-35-03.0 N	96-57-49.0 W
WNLG265	20K0F3E	460.475	28	400	FB2	141	107	101	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.475	29	430	FB2	138	99	92	32-46-41.0 N	96-45-30.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI705 Loc 1 453.3125 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

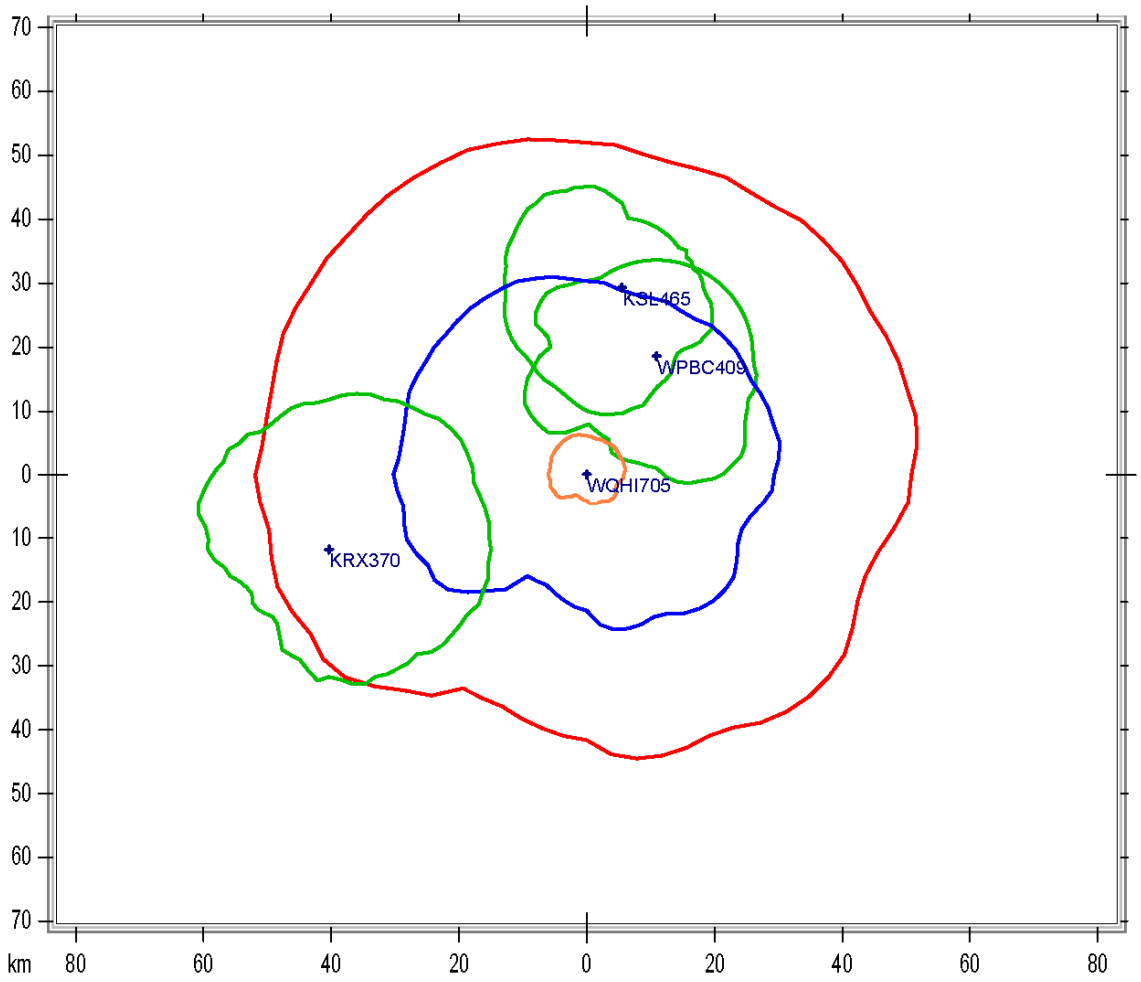
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQHI705	11K2F3E	453.3125	0	100	FB8	230	40	94	32-39-43.0 N	96-54-49.0 W
KRY920	20K0F3E	453.3000	35	85	FB2	180	46	43	32-50-08.0 N	97-13-11.0 W
KRY920	20K0F3E	453.3000	35	85	FB2	185	30	30	32-50-39.0 N	97-12-50.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI705 Loc 1 453.4875 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

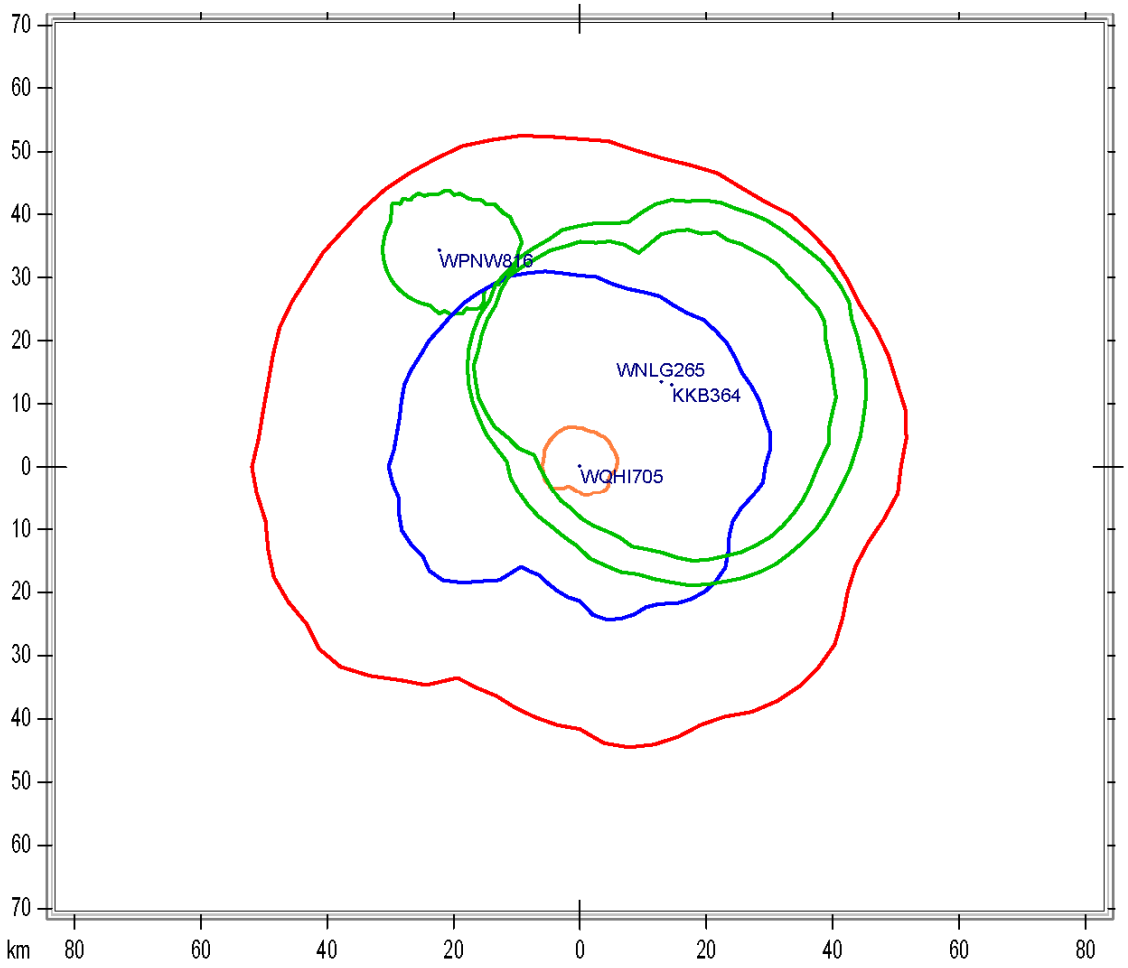
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WPBC409	20K0F3E	453.4750	21.47	335	FB2	152	31	28	32-49-42.0 N	96-47-47.0 W
WQHI705	11K2F3E	453.4875	0	100	FB8	230	40	94	32-39-43.0 N	96-54-49.0 W
KSL465	20K0F3E	453.5000	29.72	90	FB	178	48	63	32-55-31.0 N	96-51-16.0 W
KRX370	20K0F3E	453.5000	42.2	240	FB2	264	39	72	32-33-17.0 N	97-20-42.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI705 Loc 1 460.1125 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

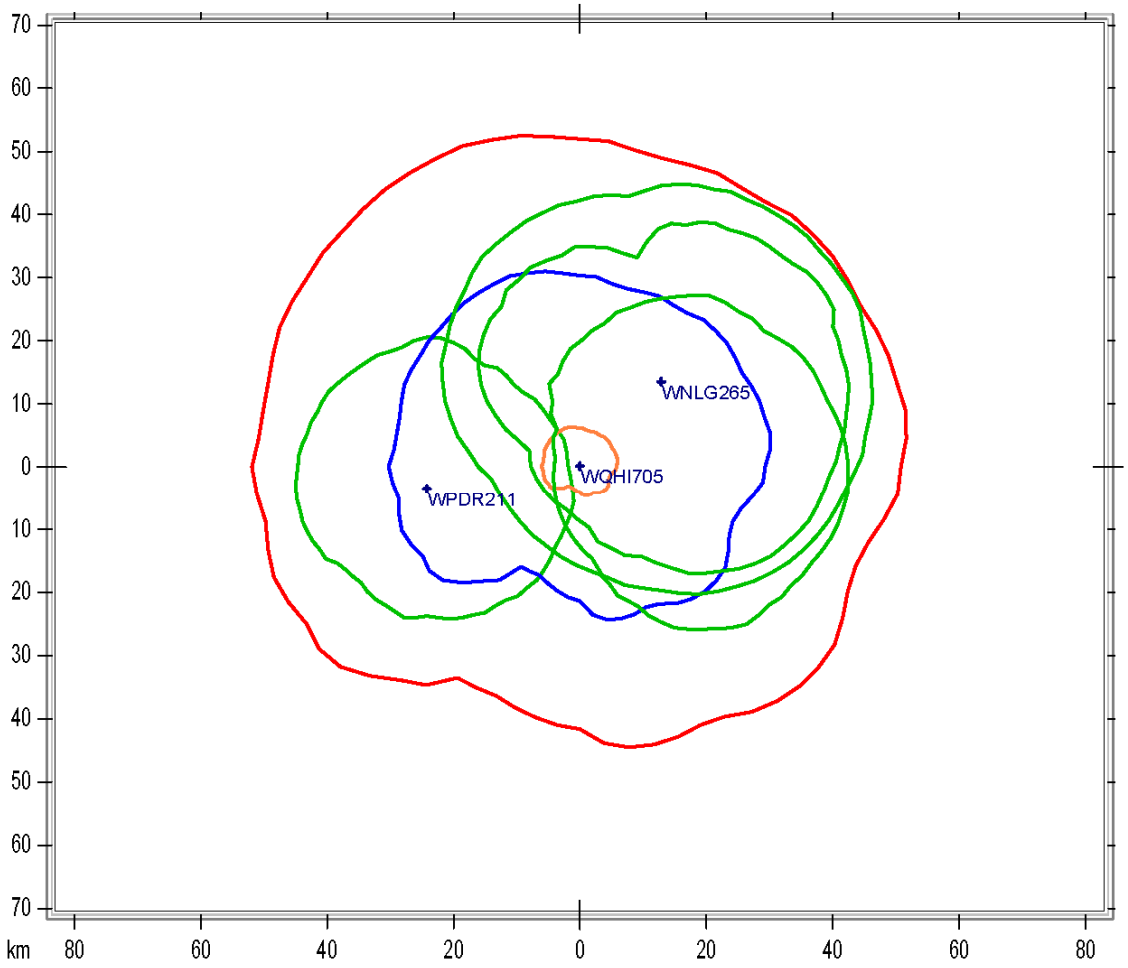
Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WPNW816	20K0F3E 11K0F3E	460.1	41	40	FB2	183	37	34	32-58-14.0 N	97-09-05.0 W
WQHI705	11K2F3E	460.1125	0	100	FB8	230	40	94	32-39-43.0 N	96-54-49.0 W
WNLG265	20K0F3E	460.125	19	400	FB2	141	91	85	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.125	19	370	FB2	138	132	125	32-46-41.0 N	96-45-30.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix C
Derating Contour Comparison Case
South West Communications Center

WQHI705 Loc 1 460.2875 11k and 16k Adjacents



Red: 21 dBu Blue: 33.5 dBu Orange: 61 dBu Green: 39 dBu

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQIK789	20K0F3E	460.275	13	500	FB2	180	42	63	32-38-46.0 N	96-46-34.0 W
WNLG265	20K0F3E	460.275	19	400	FB2	141	152	146	32-46-57.0 N	96-46-32.0 W
KKB364	20K0F3E	460.275	19	550	FB2	138	88	81	32-46-41.0 N	96-45-30.0 W
WQHI705	11K2F3E	460.2875	0	100	FB8	230	40	94	32-39-43.0 N	96-54-49.0 W
WPDR211	16K0F1D	460.3	25	95	FB2	206	91	107	32-37-46.0 N	97-10-20.0 W

Contour Legend

Description	Color	dBu
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Contour:	Blue	33.5
TSB88 Based 6.25 Adjacent Channel Contour:	Orange	61

Appendix D
Derating Contour Comparison Case
Nucor Steel

Nucor Steel of Decatur Alabama was one of the first (if not the first) multi-site UHF trunked systems taking advantage of 4 kHz channels.

The system is authorized under callsigns WQIK363 and WQIG568, both issued in 2008, prior to the current LMCC consensus for the clearance of 6.25 kHz channels.

The system consists of three sites and 18 UHF very narrow band (4 kHz) digital channels. One site has 6 channels, a second site has 3 channels, and the third site has 9 channels.

The system was substantially complete and placed into operation on or about 02/09/2009.

This is a networked centralized trunked system, in which the control channel rotates each 24 hours on each site. It has been in continuous operation for over a year.

Of the 18 channels involved in the system, only 6 of the assigned frequencies are not on channel centers of frequencies authorized 11k or 16k emissions, and therefore do not fall under the LMCC “6.25 kHz or Equivalent” coordination census (there were no other very narrow channels within the specified “affected” bandwidth). Of these six, five do not meet current LMCC clearance standards for "6.25 kHz and Equivalent" channels. Three do not meet the TSB88 based clearance criteria.

This system has received no known complaints due to adjacent channel interference.
This system has received no known interference due to adjacent channel stations.

Contour Legend:

Description	**Color**	**dBu**
FCC's 90.187 UHF Cochannel Service Contour:	Green	39
FCC's 90.187 UHF Cochannel Interference Contour:	Red	21
LMCC's Consensus 6.25 kHz Adjacent Channel Interference Contour:	Blue	29
TSB88 Based Adjacent Channel Interference Contour for 11k:	Orange	61
TSB88 Based Adjacent Channel Interference Contour for 16k	Black	41

Notes:

1. Only adjacent stations that touch the cochannel service contour are included.

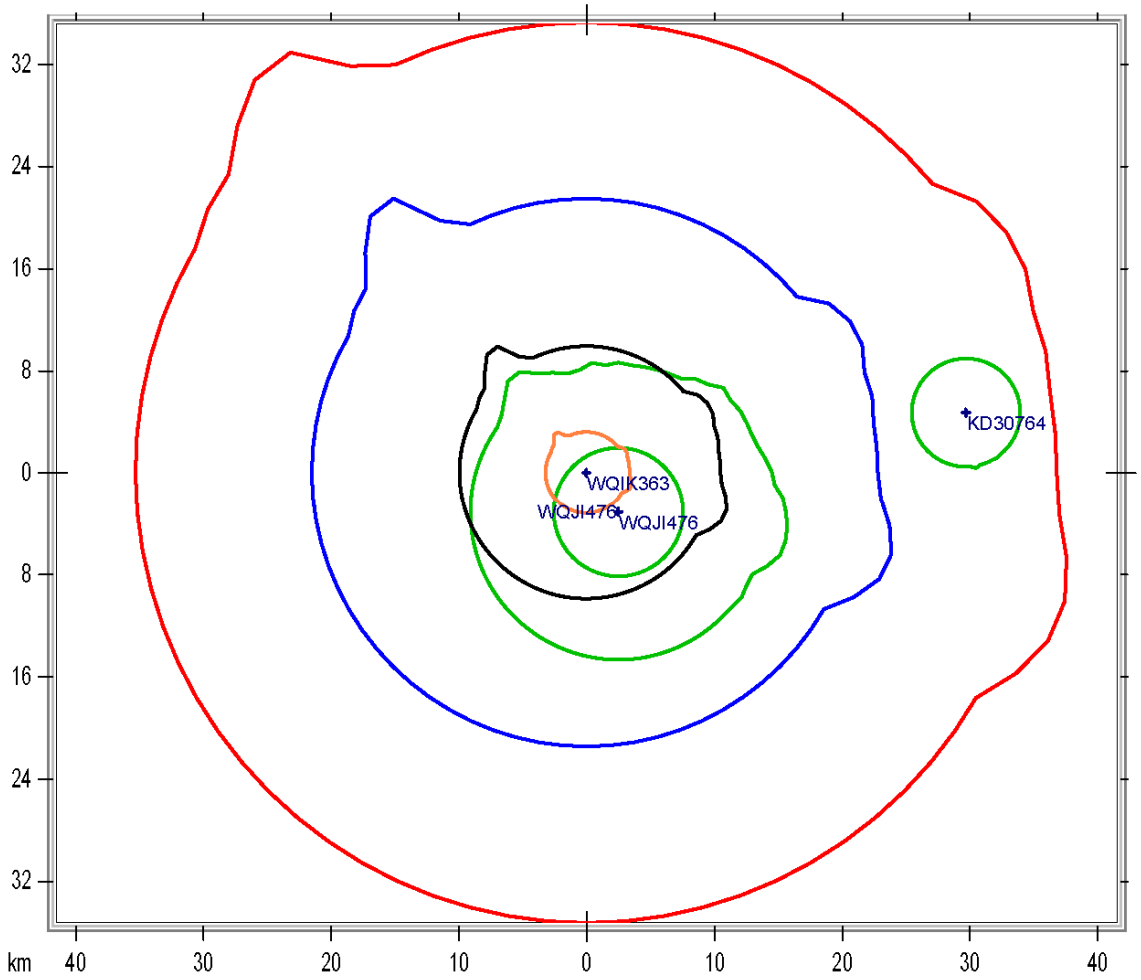
2. Some data has been rounded in this presentation for clarity. The graphics were generated with the more precise data.

3. Below each graphic, the yellow highlighted callsign is the "interferer". All other stations are adjacent channel stations.

4. Some emissions have been redacted for space.

Appendix D
Derating Contour Comparison Case
Nucor Steel

WQIK363 Loc 1 461.68125 4k and Affected Adjacents



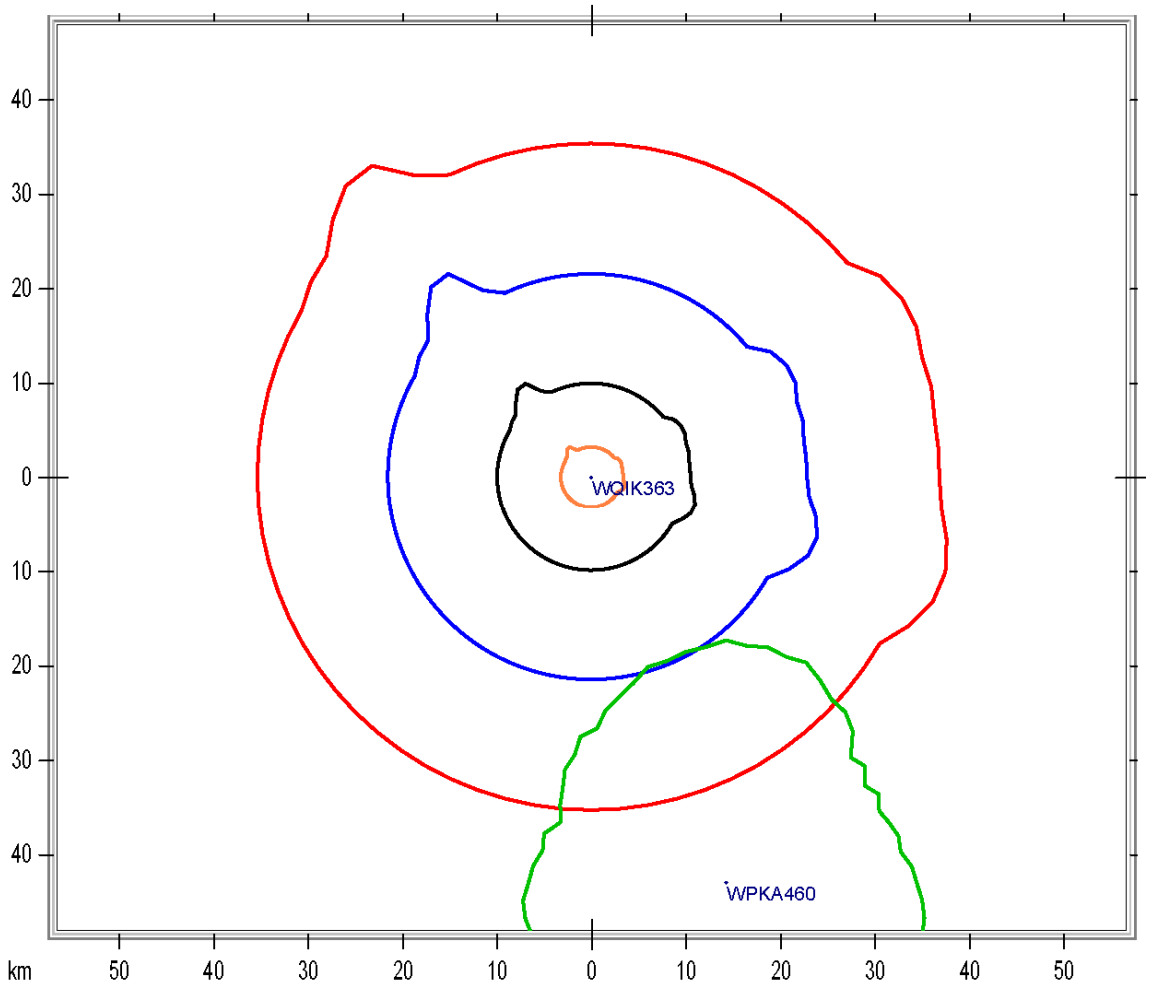
Red: 21 dBu Blue: 29 dBu Black: 41 dBu Orange: 61 dBu Green: 39 dBu

Freq	Max Bandwidth	Note
461.675	**25k**	**Lower 7.5 kHz Affected Channel**
461.68125	6k	**System Frequency**
461.6875	**11k**	**Upper 7.5 kHz Affected Channel**

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQIK363	4K00F1D	461.68125	0	100	FB8	178	27	21	34-38-22.0 N	87-04-24.0 W
WQJI476	11K2F3E	461.6875	4	4	MO	176	6	-1	34-36-41.0 N	87-02-45.0 W
WQJI476	11K2F3E	461.6875	4	120	FB2	178	28	23	34-36-41.0 N	87-02-45.0 W
KD30764	20K0F3E	461.6875	30	2	MO	194	6	3	34-40-55.0 N	86-44-52.0 W

Appendix D
Derating Contour Comparison Case
Nucor Steel

WQIK363 Loc 1 461.90625 4k and Affected Adjacents



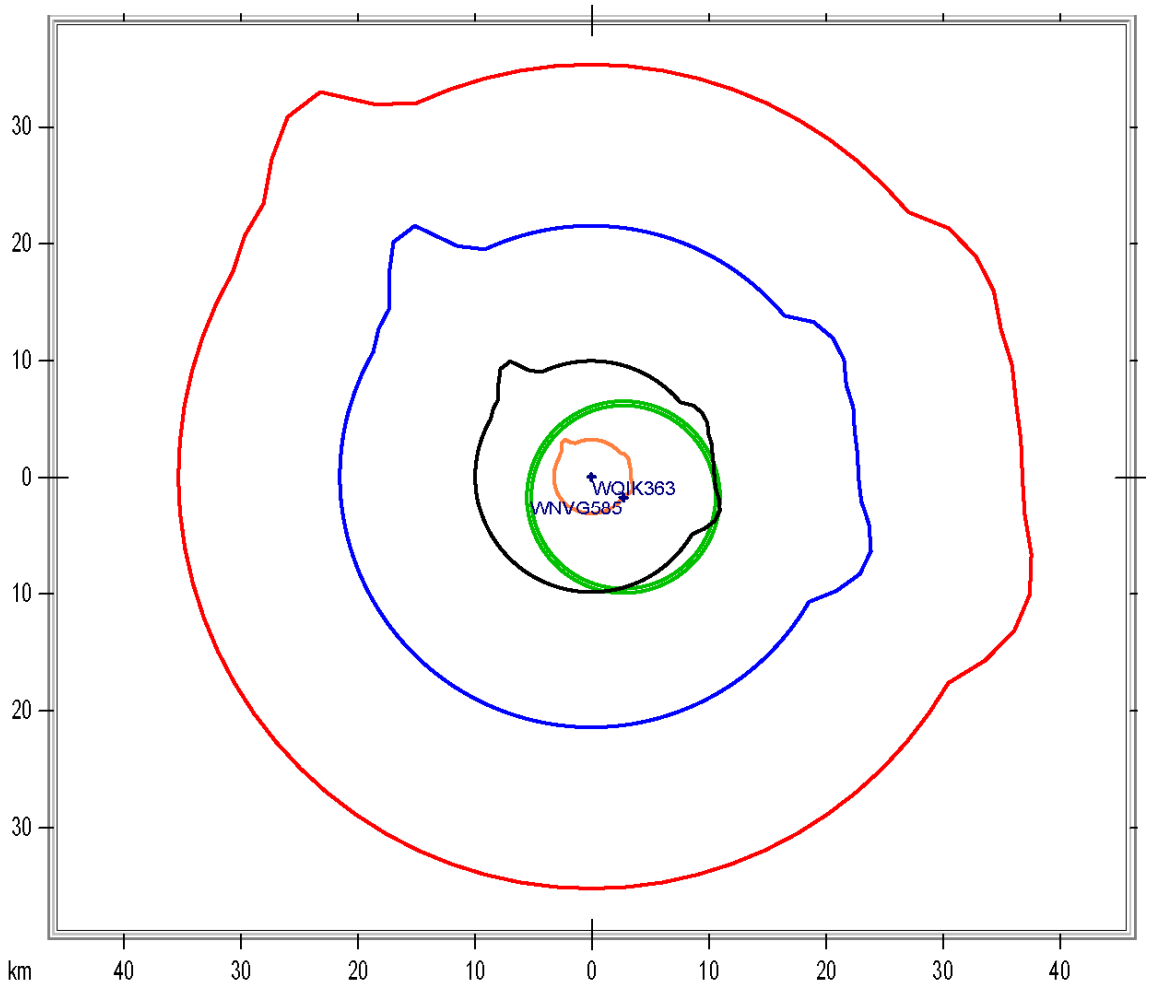
Red: 21 dBu Blue: 29 dBu Black: 41 dBu Orange: 61 dBu Green: 39 dBu

Freq	Max Bandwidth	Note
461.9	**25k**	**Lower 7.5 kHz Affected Channel**
461.90625	6k	**System Frequency**
461.9125	**11k**	**Upper 7.5 kHz Affected Channel**

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQIK363	4K00F1E	461.90625	0	100	FB8	178	27	21	34-38-22.0 N	87-04-24.0 W
WPKA460	20K0F3E	461.9	45	85	FB4	317	54	118	34-15-08.0 N	86-55-01.0 W

Appendix D
Derating Contour Comparison Case
Nucor Steel

WQIK363 Loc 1 462.10625 4k and Affected Adjacents



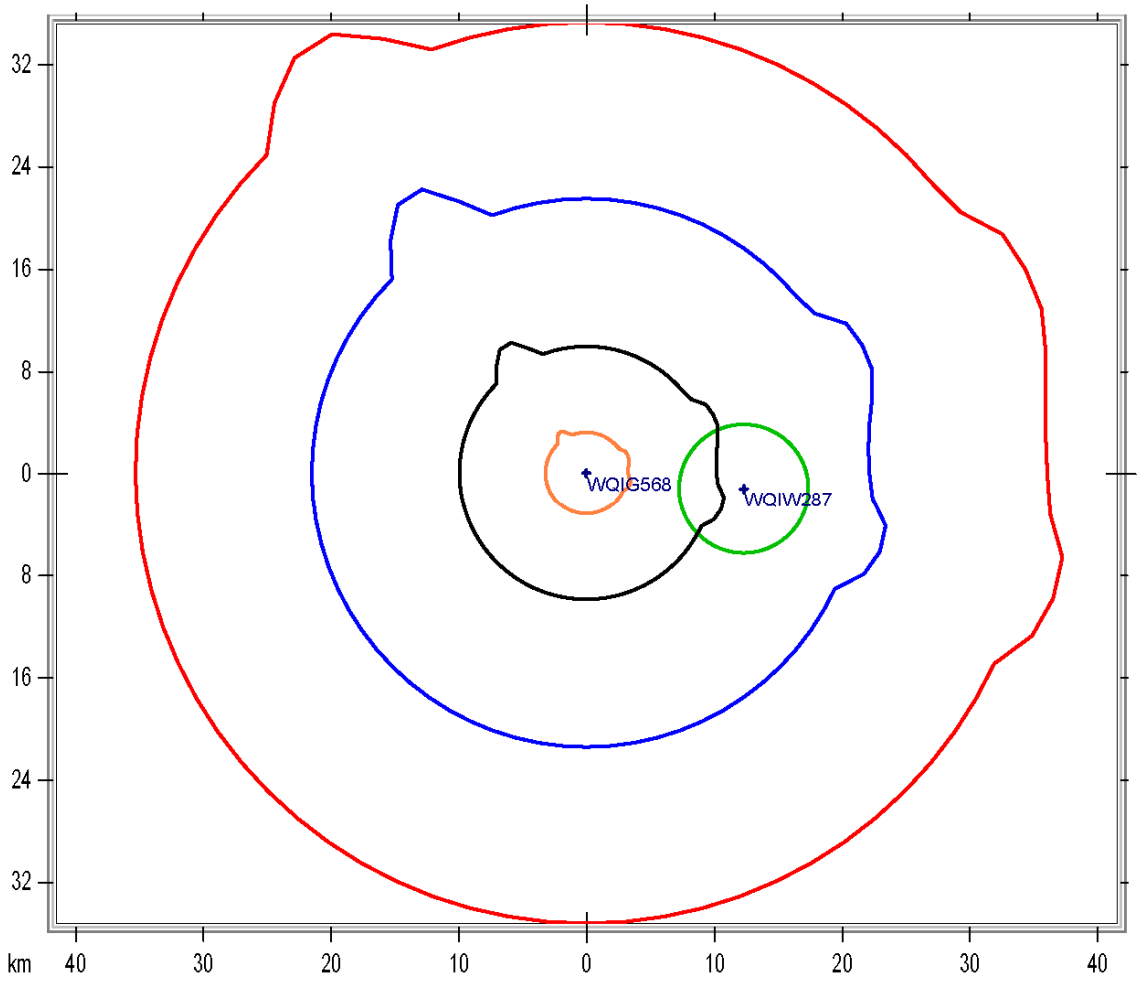
Red: 21 dBu Blue: 29 dBu Black: 41 dBu Orange: 61 dBu Green: 39 dBu

Freq	Max Bandwidth	Note
462.1	**25k**	**Lower 7.5 kHz Affected Channel**
462.10625	**6k**	**System Frequency**
462.1125	**11k**	**Upper 7.5 kHz Affected Channel**

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQIK363	4K00F1E	462.10625	0	100	FB8	178	27	21	34-38-22.0 N	87-04-24.0 W
WNVG585	20K0F3E	462.1	3	25	MO	185	6	10	34-37-25.0 N	87-02-36.0 W
WNVG585	20K0F3E	462.1	3	30	FB2	183	6	8	34-37-25.0 N	87-02-36.0 W

Appendix D
Derating Contour Comparison Case
Nucor Steel

WQIG568 Loc 1 464.33125 4k and Affected Adjacents



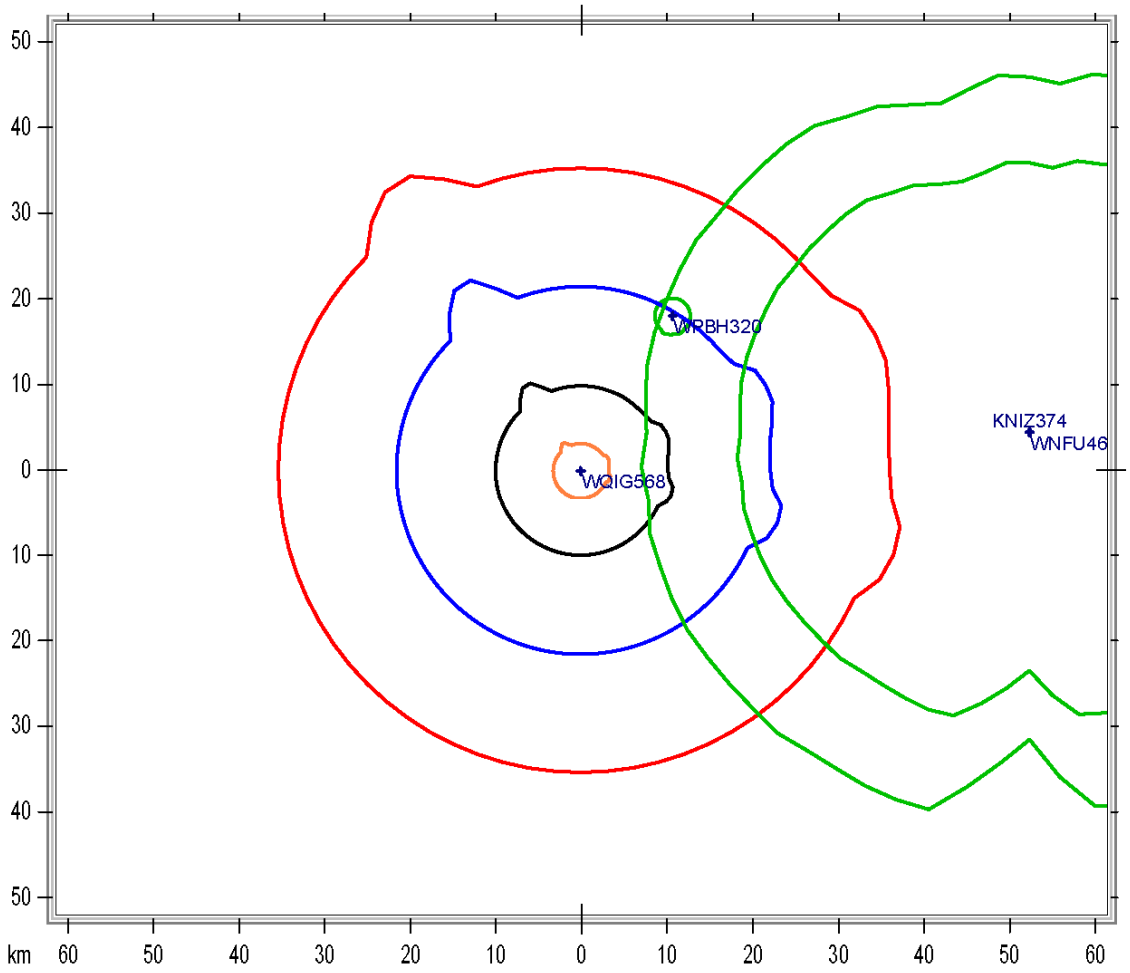
Red: 21 dBu Blue: 29 dBu Black: 41 dBu Orange: 61 dBu Green: 39 dBu

Freq	Max Bandwidth	Note
464.325	**25k**	**Lower 7.5 kHz Affected Channel**
464.3313	6k	**System Frequency**
464.3375	**11k**	**Upper 7.5 kHz Affected Channel**

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WQIG568	4K00F1E	464.33125	0	100	FB8	174	30	17	34-38-23.0 N	87-05-21.0 W
WQIW287	11K2F3E	464.325	12	4	MO	169	6	-3	34-37-43.0 N	86-57-15.0 W

Appendix D
Derating Contour Comparison Case
Nucor Steel

WQIG568 Loc 1 464.95625 4k and Affected Adjacents



Red: 21 dBu Blue: 29 dBu Black: 41 dBu Orange: 61 dBu Green: 39 dBu

Freq	Max Bandwidth	Note
464.95	**25k**	**Lower 7.5 kHz Affected Channel**
464.95625	**6k**	**System Frequency**
464.9625	**11k**	**Upper 7.5 kHz Affected Channel**

Call Sign	Emissions	Freq	Dist_km	ERP_w	Class	GL_m	AGL_m	HAAT_m	Lat	Lon
WNFU466	20K0F3E	464.95	53	57	FB6	460.6	152	367	34-40-50.0 N	86-30-55.0 W
KNIZ374	20K0F3E	464.95	53	510	FB2	457	73	284	34-40-50.0 N	86-30-54.0 W
WQIG568	4K00F1E	464.95625	0	100	FB8	174	30	17	34-38-23.0 N	87-05-21.0 W
WPBH320	20K0F3E	464.9625	21	0.1	MO	218	6	12	34-48-10.0 N	86-58-18.0 W